APPENDIX – C

EQUIPMENT DATA SHEETS

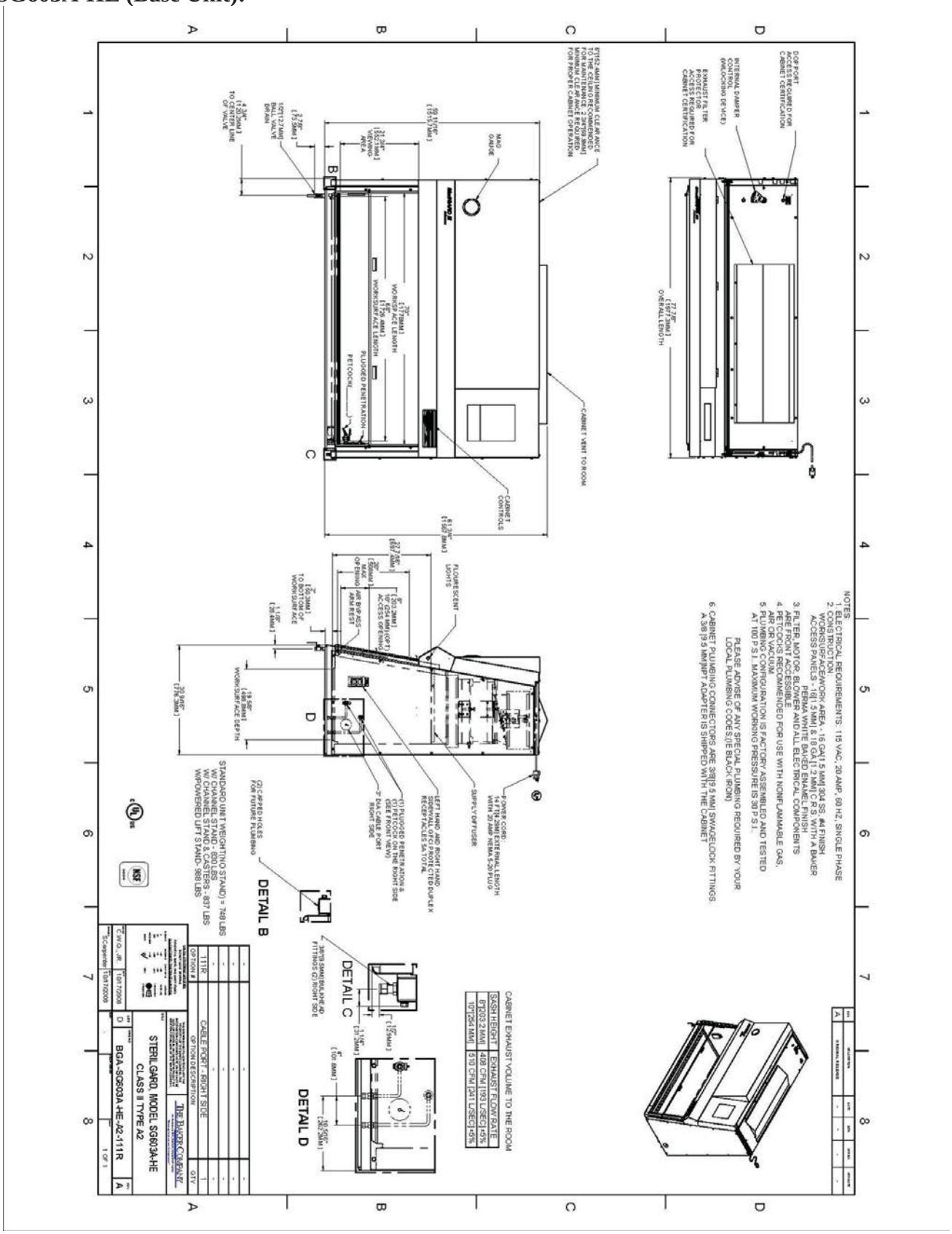
(SEE EQUIPMEMT SCHEDULE IN DRAWINGS)

Project No. 664-14-427
1st Floor Northwest (1NW) - Clinical Lab Phase lll
Department of Veterans Affairs, San Diego Healthcare System.

Part 1 – Microbiology Equipment

SRD ARCHITECTS INC

SG603A-HE (Base Unit):



Enviro-Control™ | KE2 Evaporator**Efficiency**

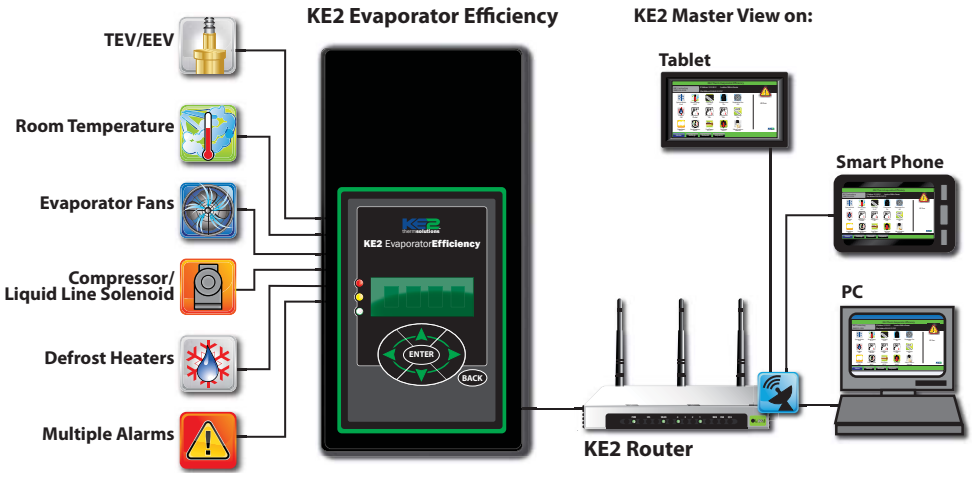
Installation Instructions

01/13 Rev. A 151627

Introduction

The KE2 Evaporator Efficiency (KE2 Evap) is an electronically operated evaporator controller engineered to save energy in refrigeration systems through precise control of superheat, space temperature, fan cycling, reducing compressor runtime, and implementing demand defrosts. The KE2 Evap offers quick payback, and a life expectancy that matches that of the system. The controller pays for itself, and then continues to pay dividends for the life of the system.

KE2 Evaporator Efficiency - Controls and Communicates



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Location

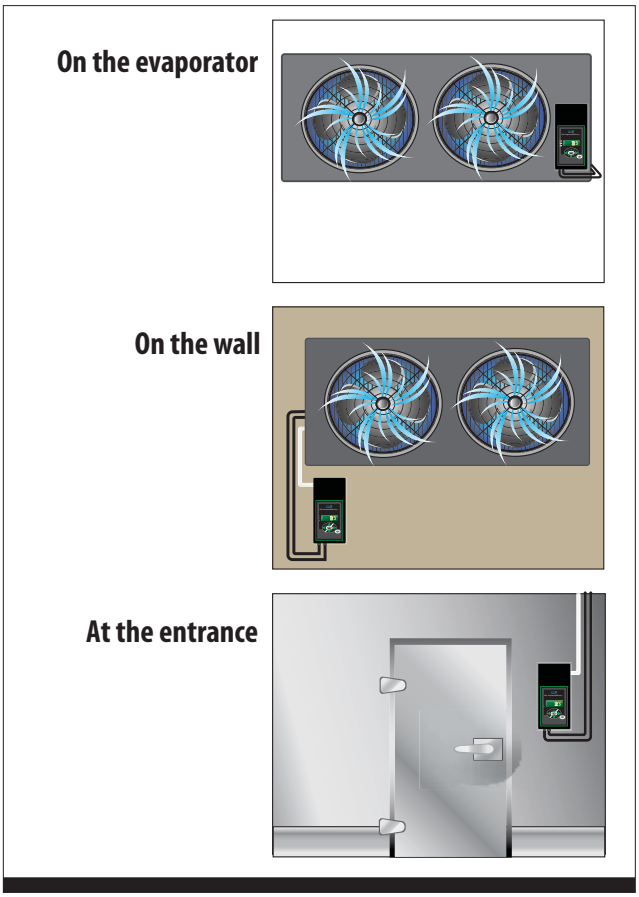
The KE2 Evap was developed with ease of installation in mind. The controller is supplied in an enclosure, and encapsulated to protect the circuitry from moisture damage. This extra level of protection allows the controller to be installed in the refrigerated space.

When installing the controller, it may either be installed on an interior/exterior wall or on the evaporator. Many evaporators have sufficient space to install the controller on the face of evaporator or on its housing. Locating the controller as close to the evaporator as possible reduces the amount of wiring when converting existing systems, as well as when it is applied on new applications.

Users may find it beneficial to install the controller in a location providing easy access -- on the wall or near the entrance. This enables the user to easily view the display, and eliminates the need to use a ladder or lift to modify the setpoints or check alarms.

If viewing the temperature outside the walk-in or refrigerated room is desirable, the KE2 Evap may be used as a digital thermostat. The controller is then installed near the door of the space for easy viewing of the room temperature and/or system status. See **Figure 1** for locations.

Figure 1 - KE2 Evap Installation Locations



If installing the controller on the face of the evaporator, preexisting knockouts on the evaporator should be used for installing the high voltage wiring. If knockouts do not preexist, hole(s) may be carefully cut into an unobstructed area of the evaporator case. If modifying the face of the evaporator is not feasible or desired, the controller's conduit knockouts may be used with ½ inch conduit.

The bottom side of the controller includes a cutout with cable tie slots providing a strain relief for the low voltage and sensor wires. Additional knockouts are available on either side if conduit is preferred.

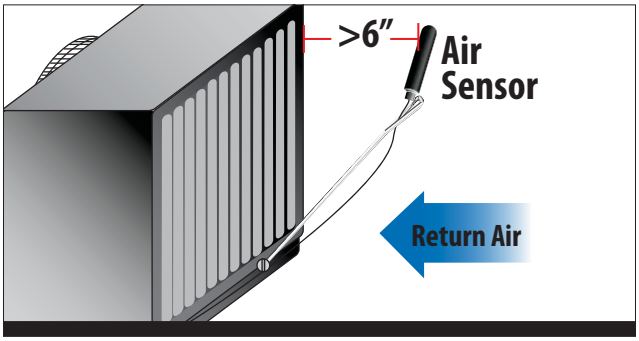
Installation & Wiring

The KE2 Evap is supplied with pluggable connectors for all connections. Pluggable connectors permit the controller to be placed in a safe location while the wiring is installed. They also simplify the wiring, allowing the wires to be fastened to the screw terminals in the open air. Once all wiring is completed using accepted wiring practices, it is plugged into the controller prior to final mounting.

Although there is one pressure transducer and four temperature sensor inputs, when used with mechanical valves (TEVs), KE2 Evap only requires the **(2) sensors supplied with the kit.** One sensor reads the return air temperature and the other measures the coil temperature. **NOTE! Sensor location is critical to the proper operation of the controller.**

Return Air Temperature Sensor - The air temperature sensor is installed in the return air of the evaporator using the included sensor mount. Most applications allow the sensor mount to be installed using an existing screw. On evaporators where using an existing screw is not possible, the included self-tapping screw may be used to secure the sensor mount to the evaporator. **Note: Be careful to avoid damage to an evaporator tube or causing a leak in the drip pan.** When installing, it is important to prevent the air sensor from coming into contact with the mounting bracket, cable ties, or any other solid material. **Figure 2** shows an example of how to mount the sensor. The sensor must be a minimum of 6 inches from the coil surface.

Figure 2 - Return Air Sensor Placement



After the sensor is installed, route the wire back to the controller location. When routing sensor wire, it is important to avoid interference from high voltage lines. If sensor wire is run parallel to the high voltage, there is a potential for inductance to affect the sensor reading. This is of particular concern with long wire runs. When extending sensors, use the 18 gage, shielded twisted pair. Sensor wires can be run beyond 100 feet when using special considerations. Contact KE2 Therm. After the wire has been successfully routed, it may be connected to the pluggable terminal on the controller.

Coil Temperature Sensor - As a critical input to the controller, it is essential the sensor is located at the **coldest point on the evaporator coil** for optimal operation. The coil sensor is an integral part of the control algorithm used to determine coil efficiency, to initialize defrosts, and to terminate defrosts.

KE2 Therm offers general guidance for sensor locations based on the coil construction. **Figure 3** shows the recommended locations for the coil sensor for each evaporator type.

When installing on draw through models, the sensor should be located behind the coil in the lower corner nearest the suction header. Blow through models should be installed on the front of the coil, in the upper corner also nearest to the suction header. When installing the sensor into the coil, the sensor should be positioned half way between the circuit tubes and, perpendicular to the face of the coil. When choosing the location, the sensor should not be located adjacent to the electric heating elements. Locating the sensor too close to the elements will cause false defrost termination temperatures. The sensor should be approximately half the distance between the heaters if possible. **Figure 4** shows the proper sensor placement.

Due to the many factors influencing the evaporator performance, it is impossible for KE2 Therm to provide the proper location of every installation. However, the coil sensor is an integral part of the control algorithm used to determine coil efficiency to initiate, as well as, terminate defrosts. The coldest point in the coil can be identified from existing system knowledge or by monitoring the normal operation.

Controller Power - The high voltage wiring is protected by a metal shield screwed to the back side of the controller. The shield should be removed to gain access to the wiring connections, making note of the location of the screws. The screws in the upper corners are coarse thread screws, while the screw in the middle is a 4-40 machine screw.

The controller accepts either 115V or 208/240V incoming power. The controller includes metal oxide varistors (MOVs), providing protection from voltage spikes. MOVs use the same technology commonly applied to protect consumer electronics. They function by filtering out voltages high enough to damage the board. When the voltage exceeds the allowed amount, the MOVs short to ground, protecting the circuitry. For additional protection, the board has a replaceable BK/MDL-1/4 fuse in line. The grey plug is accessible without removing the metal shield in the fuse

Figure 3 - Proper Sensor Location

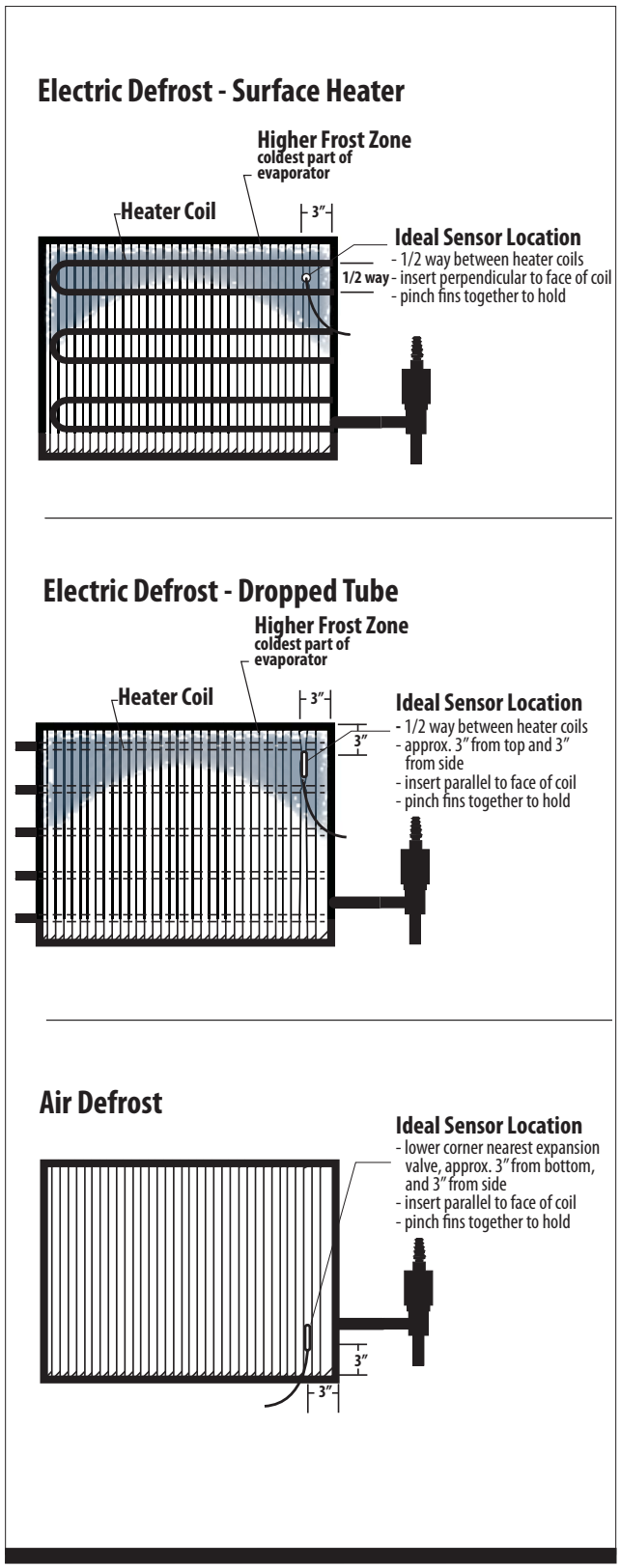
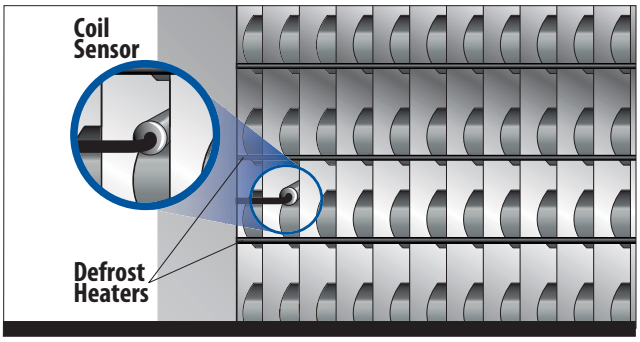


Figure 4 - Coil Sensor Placement



holder. Depress slightly and turn 1/4 turn counterclockwise to remove. Replace by depressing slightly and turning 1/4 turn clockwise. Do not overtighten.

The board uses a pluggable screw terminal connector to connect incoming power. The terminal is located in the top right corner of the controller when the terminals are facing the user. See **Figure 5**.

Fan and Defrost Relays - There are 2 larger relays on the controller with spade connectors. These are used for the evaporator fans and defrost heaters. Due to the spacing of the enclosure the spades require a 90 degree terminal. KE2 Therm has included (4) spade connectors to assist in wiring the relays.

Evaporator Fan Relay - The fan relay is rated 10A inductive at 240V. One leg of the incoming power for the fans should be connected to the COM terminal of the fan relay, the upper of the two larger relays. The remaining leg, (L2) should be connected to one lead of the fan. The remaining fan lead should be connected to the NO (Normally Open) terminal on the fan relay. See **Figure 7**.

Defrost Heater Relay - The heater relay is rated 20A resistive at 240V. One leg of the incoming power for the heaters should be connected to the COM terminal of the heater relay, the lower of the two larger relays. The remaining leg, (L2) should be connected to one lead of the heater. The remaining heater lead should be connected to the NO (Normally Open) terminal on the heater relay.

Compressor/Liquid Line Solenoid Relay - The compressor relay is rated at 3A induction at 240V. This relay uses the 3-position pluggable screw terminal to make the connection to the board. The relay is not intended to control the compressor directly. It is designed to be used to control the liquid line solenoid or as a pilot to the compressor contactor. One leg of the incoming power supply (L1) should be connected to COM terminal of the compressor relay, the upper of the two smaller relays. The remaining leg, (L2), should be connected to one lead on the solenoid/compressor contactor. The remaining lead, should be connected to the normally open (NO) position on the terminal.

Alarm Relay - The alarm relay is rated at 3A inductive at 240V. This relay uses the 3-position pluggable screw terminal to make the connection to the board. The relay may be used to connect an audible alarm, light, or to alert a 3rd party alarm system. One leg of the incoming power supply (L1) should be connected to COM terminal of the alarm relay, the lower of the two smaller relays. The remaining leg, (L2), should be connected to one lead on the alarm. The remaining alarm lead, should be connected to the normally open (NO) position on the terminal.

After all high voltage wiring is completed the metal shield must be replaced and screws tightened.

Additional Inputs

Suction Temperature Sensor - The suction temperature sensor is required when applying the controller with an electronic expansion valve. The sensor's proximity to the evaporator outlet differs slightly for electronically controlled valves from the placement of a TEV bulb. Due to the more refined control from an electronically controlled valve, the sensor must be placed as close to the outlet of the coil as feasible. Although the distance from the outlet is different, the nature of the refrigerant's flow through the tube remains unchanged, thus the orientation of the sensor remains at the 4 or 8 o'clock position. The sensor should be secured to the suction line using the included wire ties designed for low ambient operation.

Pressure Transducer - In addition to the suction temperature sensor, a pressure transducer is also required for superheat measurement when applying an electronic expansion valve. The pressure tap should be mounted on the top of a horizontal section of tube. It should be located near the suction sensor, approximately 3 inches downstream from the position of the temperature sensor.

Auxiliary Temperature Sensor -The auxiliary temperature sensor provides flexibility and may be used for any purpose desired by the user. The placement of the sensor is dependent on the requirements of the user's intended application. The Auxiliary Temperature sensor must be supplied by KE2 Therm.

Digital Inputs - The controller includes (3) digital inputs. See **Table 3** for configuration options.

Figure 5 - KE2 Evaporator Efficiency - Diagram (back view)

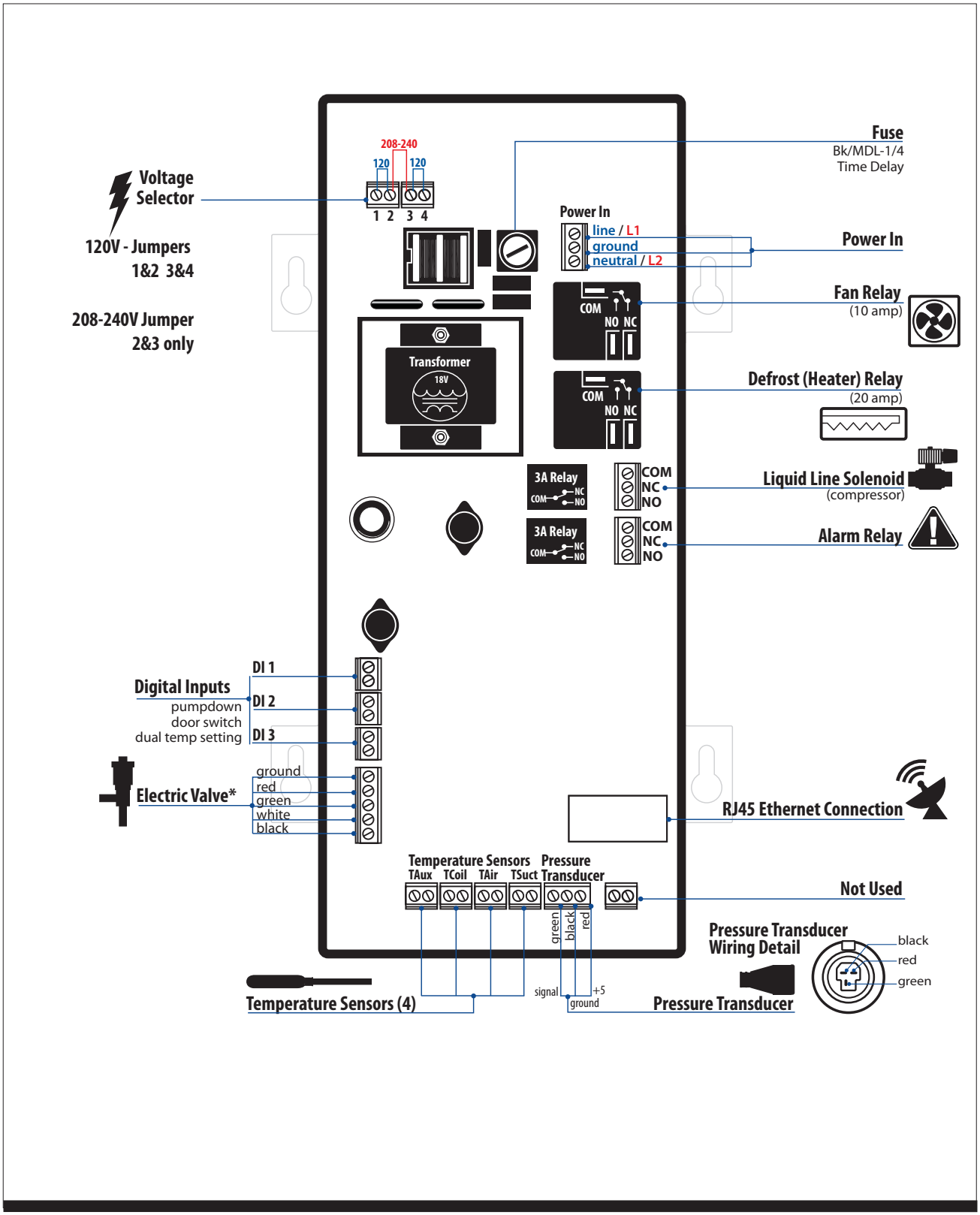
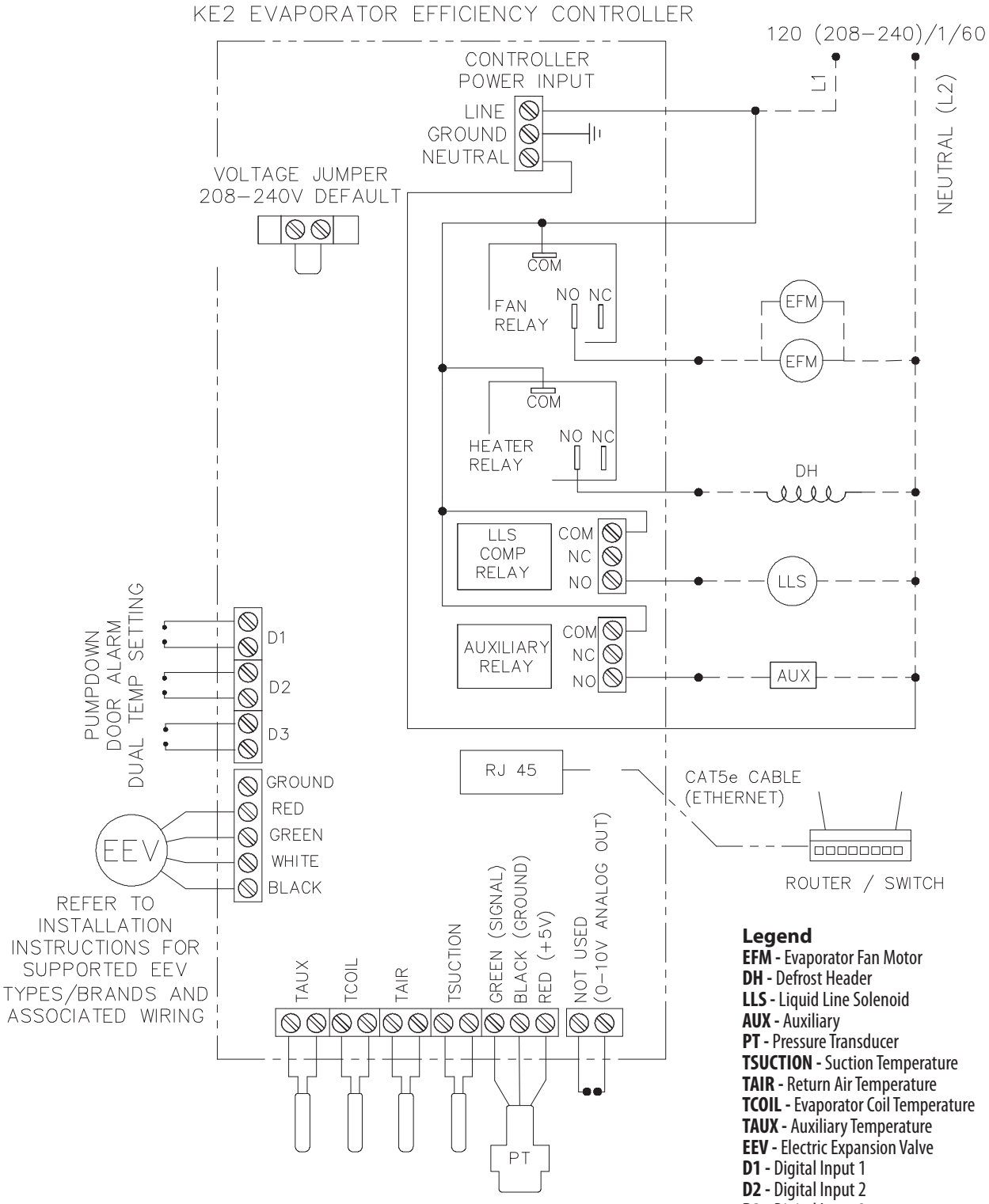


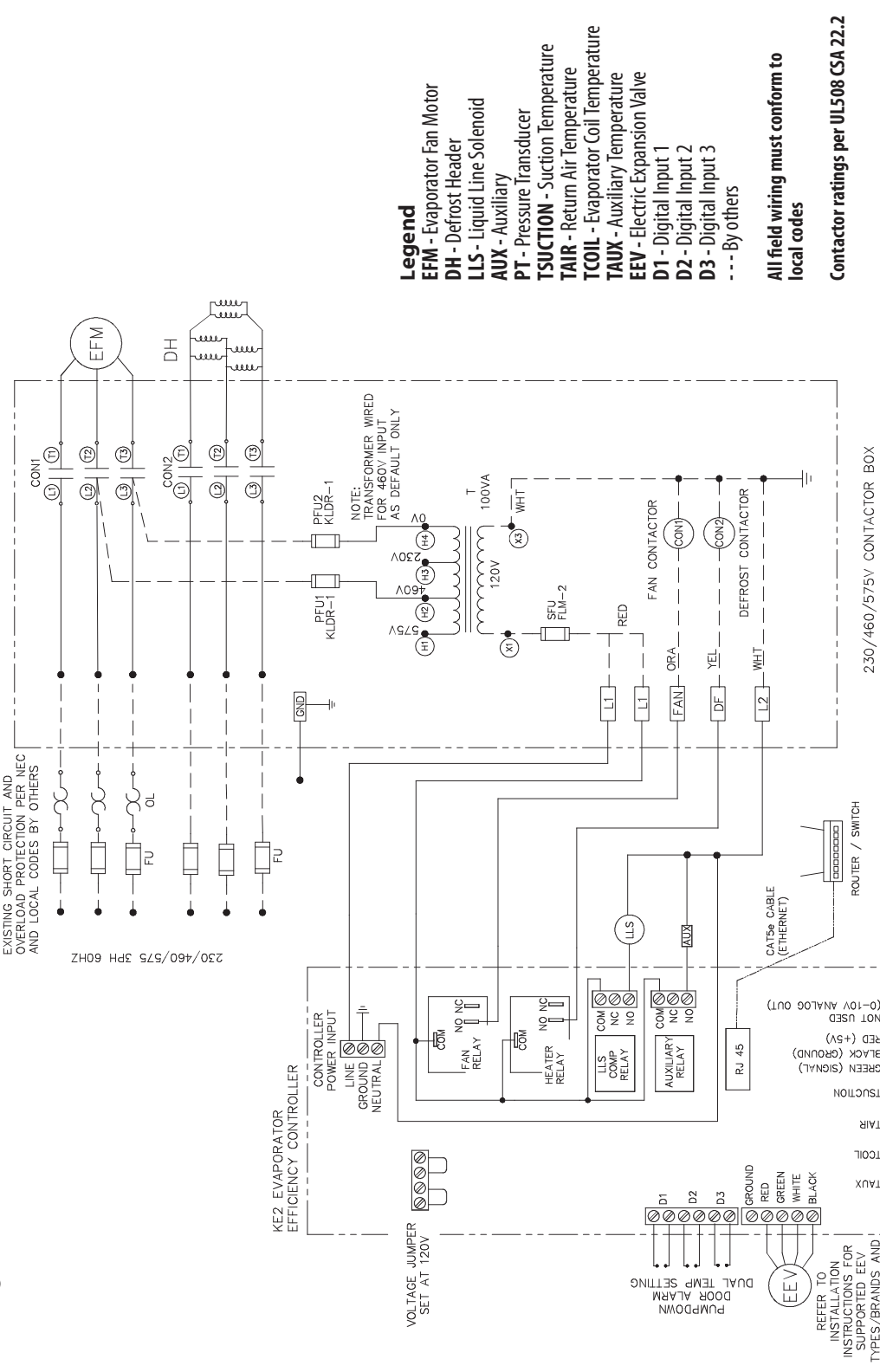
Figure 7 - Wiring Schematic - Controller New Install



Legend
EFM - Evaporator Fan Motor
DH - Defrost Header
LLS - Liquid Line Solenoid
AUX - Auxiliary
PT - Pressure Transducer
TSUCTION - Suction Temperature
TAIR - Return Air Temperature
TCOIL - Evaporator Coil Temperature
TAUX - Auxiliary Temperature
EEV - Electric Expansion Valve
D1 - Digital Input 1
D2 - Digital Input 2
D3 - Digital Input 3
- - - By others

All field wiring must conform to local codes

Figure 8 - Wiring Schematic - Controller with KE2 Contactor Box



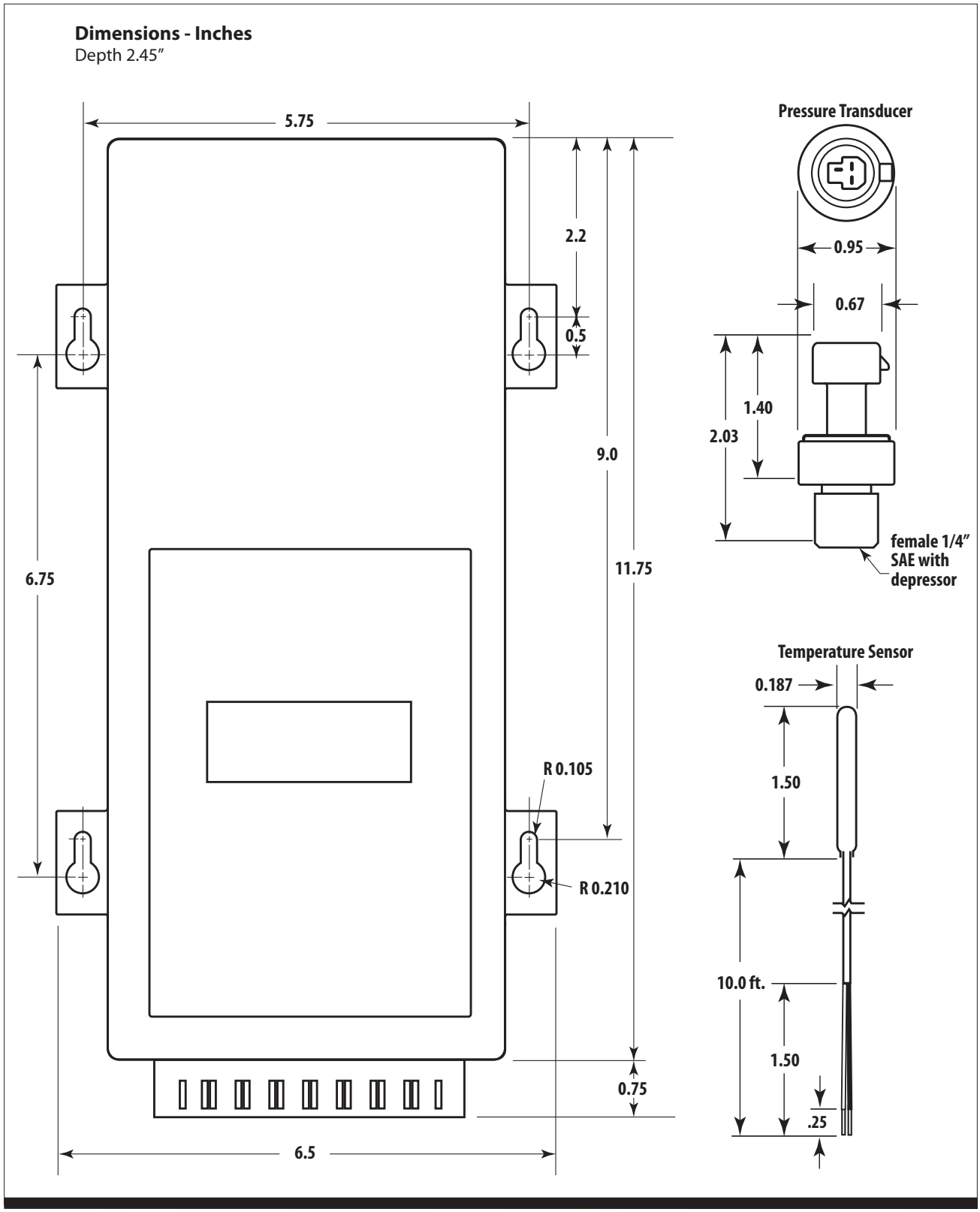
Evaporator Fan Motors
Con1 Max HP & Amp Ratings (Total All Fans)

Voltage	Max HP	Max AMPS
230 3Ø	15	42
460 3Ø	30	40
575 3Ø	30	32

Existing Defrost Heaters Max Current Ratings
(Amps are Total All Heaters)

Relay Box P/N	230V 3Ø	460V 3Ø	575V 3Ø
20217	54 Amps	52 Amps	52 Amps
20218	68 Amps	65 Amps	62 Amps
20219	80 Amps	77 Amps	62 Amps

Figure 9 - KE2 Evaporator Efficiency - Dimensions (front view)



Mounting the Controller

Once the wiring has been run to the controller location, the controller can be connected. When installing the KE2 Evaporator Efficiency, the (4) screws supplied in the kit may be preinstalled in the mounting surface. The controller has keyholes in each mounting tab to allow the controller to be installed over the screws. The mounting pattern can be seen in **Figure 9.**

User Interface

The KE2 Evap's onboard user interface uses a familiar 6-button arrangement to simplify navigation through the controller's menus. The menu has been grouped by category to provide an easy to program structure. By grouping the menu by each functional area, the user is not required to scroll though unrelated setpoints to access the desired functionality.

The **left** and **right arrows** move between the categories. When pressed while in a menu, the left and right arrows will move to the main screen or the adjacent menu.

The **up** and **down arrows** move the user through the available options for each group. All users are allowed access to the variable alarms. All other information is password protected to prevent unauthorized access to the controller's functionality.

The **ENTER** button is used to save an input option when it has been changed. **The enter button must be held for 3 seconds to prevent accidental changes.** Changes may be discarded by waiting, to allow the controller to timeout and return to default screen, or hitting the **BACK** button.

The BACK button is used to return to the previous screen. Pressing the BACK button twice at any time will return the user to the default view. **See Table 2 (following page).**

Controller Setup

Upon initially applying power to the controller, the controller will initialize, then automatically enter the **Quick Start Menu**. The Quick Start Menu consists of as little as 3 setpoints that must be configured for KE2 Evap to begin controlling the system.

Table 1 shows the Quick Start Menu. The first setpoint the user is asked to enter is the desired **ROOM TEMP**. This is followed by the **DEFROST TYPE**. The controller is designed to work with electric, hot gas, and off time defrosts. The last setpoint is the **VALVE TYPE**. The controller is defaulted to be used with a mechanical valve, but may be used with a variety of EEVs, including a customer defined valve.

These are the only setpoints required to begin controlling the system, when applied on a single evaporator with a mechanical valve, **See Table 1.**

Table 1 - Quick Start Menu

Mechanical Valve TEV 3 steps	Standard EEV 4 steps	Custom EEV 7 steps
Room Temp	Room Temp	Room Temp
Defrost Type	Defrost Type	Defrost Type
Valve Type	Valve Type	Valve Type
	Refrigerant	Refrigerant
		Motor Type (Unipolar/Bipolar)
		Motor Step Rate
		Max Valve Steps

If using a standard/predefined EEV, the user will also be prompted to specify the **REFRIGERANT**. The KE2 Evap may also be applied to user defined EEVs. When this option is selected, the user will be prompted to select **MOTOR TYPE**, **MOTOR STEP RATE**, and **MAX VALVE STEPS**. Once these have been set, the KE2 Evap will begin controlling EEV and the system. **Table 3**

Adjusting Controller Parameters

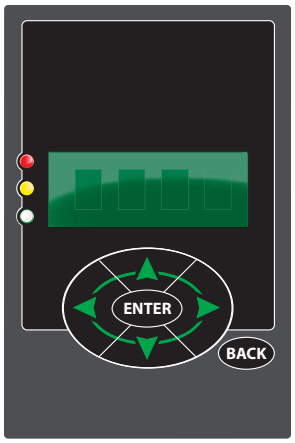
The controller has the ability to access an abundance of information from the 4-digit alphanumeric display. However, the controller requires a password, adding a degree of protection from unwanted modifications. The controller will prompt the user for a password **PASSWORD** when the user attempts to access setpoints they do not have permission to change.

Table 2 shows the menu structure of the controller. The default display of the controller always displays the actual room temperature. Pressing the **ENTER** button will display room temp **ROOM TEMP**. Pressing the **up** and **down** arrows moves the display through the **VARIABLES** menu. See **Table 2** By default, the controller only allows access to the room temperature. The **VARIABLES** menu consists of the current sensor readings and the relays' state. The **User Password (1111)** only provides access to the ROOM TEMP setpoint.

For the protection of the system, access to the **SETPOINT** and **MANUAL** control requires an **Installer Password (2222).** Pressing the right or left arrow will move from the Variables menu to the next menu, shown in **Table 2**, a complete list of parameters are shown in **Table 3.**

Pressing the **BACK** key at any time will return the user to next level up the menu. A second press will either return to the **Main Menu** or to the room temperature reading.

Table 2 - Navigation Through the Controller Menu and Menu Paramenters



Indicator lights
- **Red light** - critical alarm (system off)
- **Yellow light** - non-critical alarm (system running)
- **Green light** - compressor on
- **Green flashing** - compressor waiting on timer to start/stop

To move through controller menus:
- **Left Arrow and Right Arrow** Use to move between **Menus**
- **Up Arrow and Down Arrow** Scroll through **Menu Parameters**

To return to Main Menu: BACK Press BACK to return to the previous view.

To change settings: ENTER Press and hold ENTER for 3 seconds, when display begins blinking changes can be made

To save setting changes: ENTER Press and hold ENTER for 3 seconds to save change

Menus: **Menu Parameters:**

Non-adjustable

Variables (view only)
- ROOM TEMP
- COIL TEMP
- SYSTEM MODE
- SUPERHEAT
- SUCTION PRESSURE
- SUCTION TEMP
- SATURATION TEMP
- VALVE % OPEN
- AUX TEMP
- COMPRESSOR RELAY
- DEFROST RELAY
- FAN RELAY
- DIG 1 STATUS
- DIG 2 STATUS
- DIG 3 STATUS
- IP OCTET 1
- IP OCTET 2
- IP OCTET 3
- IP OCTET 4
- SUBNET MASK OCTET 1
- SUBNET MASK OCTET 2
- SUBNET MASK OCTET 3
- SUBNET MASK OCTET 4
- FIRMWARE VERSION

Variables for DIG IN Mode
- DIG IN MODE = DISABLED
- DIG IN MODE = 2ND (ROOM) TEMP
- DIG IN MODE = DOOR SWITCH
- DIG IN MODE = EXT ALARM
- DIG IN MODE = SYSTEM OFF
- DIG IN MODE = LIGHT SWITCH
- DIG IN MODE = CAMERA SWITCH

Alarms (view only)
- NO ALARM
- PRESSURE SENSOR
- SUCTION TEMP SENSOR
- AIR TEMP SENSOR
- COIL TEMP SENSOR
- AUX TEMP SENSOR
- HIGH SUPERHEAT
- LOW SUPERHEAT
- HIGH AIR TEMP
- LOW AIR TEMP
- EXCESS DEFROST
- DEFR TERM ON TIME
- DOOR SWITCH
- COMMUNICATION ERROR
- EXT ALARM

Setpoints*
- **ROOM TEMP**
- **DEFROST TYPE**
- **VALVE TYPE**
- *MOTOR TYPE*
- *MOTOR STEP RATE*
- *MAX VALVE STEPS*
- SUPERHEAT
- MAX OPERATING PRES
- REFRIGERANT
- AUX TEMP MODE
- AUX RELAY MODE
- MIN COMP RUN TIME
- MIN COMP OFF TIME
- REFRIG FAN MODE
- DEFROST MODE
- DEFROSTS / DAY
- 1ST DEFROST DELAY
- DEFROST FAN STATE
- DEFROST TERM TEMP
- DEFROST PARAMETER
- DRAIN TIME
- COMP RUN TIME
- ELEC DEFROST MODE
- FAN DELAY TEMP
- MAX FAN DELAY TIME
- PUMP DOWN TIME
- ***MULTI AIR TEMP CTRL***
- ***MULTI EVAP COOL***
- ***MULTI EVAP DEFROST***
- MULTI EVAP SENSOR
- HIGH TEMP ALARM OFFSET
- HIGH TEMP ALARM DELAY
- LOW TEMP ALARM OFFSET
- LOW TEMP ALARM DELAY
- DOOR ALARM DELAY
- DIG IN 1 MODE
- DIG IN 1 STATE
- DIG IN 2 MODE
- DIG IN 2 STATE
- DIG IN 3 MODE
- DIG IN 3 STATE
- 2ND ROOM TEMP
- SUCT PRES OFFSET
- SUCT TEMP OFFSET
- AIR TEMP OFFSET
- COIL TEMP OFFSET
- AUX TEMP OFFSET
- TEMP UNITS
- AIR TEMP DIFF
- EXTREME TEMP DIFF

Manual
- MANUAL CONTROL
- MANUAL VALVE
- CLEAR ALARMS
- MANUAL COMPRESSOR RELAY
- MANUAL DEFROST RELAY
- MANUAL FAN RELAY
- DHCP
- FACTORY RESET

* The Setpoint paramenters shown in **BOLD** (Valve Type, Room Temp Setpoint and Defrost Mode) need to be set by the user prior to start up. The other Setpoint Parameters can also be adjusted, however the factory setpoints are generally correct for most applications.

The Setpoint parameters shown in *ITALIC* are only displayed when an EEV is used.

The Setpoint parameters shown in ***BOLD ITALIC*** are displayed for bonded controllers only.

Enviro-Control™ Factory Default Settings

Electric Defrost Factory Settings (freezer applications)		Air Defrost Factory Settings (cooler applications)	
PARAMETER	**SETTING**	**PARAMETER**	**SETTING**
ROOM TEMP	-10.0°F	ROOM TEMP	36.0°F
DEFROST TYPE	ELEC	DEFROST TYPE	AIR
VALVE TYPE	CUSTOM	VALVE TYPE	CUSTOM
MOTOR TYPE	BIPOLAR	MOTOR TYPE	BIPOLAR
MOTOR STEP RATE	50 steps/sec	MOTOR STEP RATE	50 steps/sec
MAX VALVE STEPS	480 steps	MAX VALVE STEPS	480 steps
SUPER HEAT	8°F	SUPER HEAT	8°F
MAX OPERATING PRESSURE	150 psig	MAX OPERATING PRESSURE	150 psig
REFRIGERANT	404A	REFRIGERANT	404A
AUX TEMP MODE	2ND COIL TEMP	AUX TEMP MODE	2ND COIL TEMP
AUX RELAY MODE	ALARM RELAY	AUX RELAY MODE	ALARM RELAY
MIN COMP RUN TIME	2 minutes	MIN COMP RUN TIME	2 minutes
MIN COMP OFF TIME	5 minutes	MIN COMP OFF TIME	5 minutes
REFRIG FAN MODE	ON WITH COMPRESSOR	REFRIG FAN MODE	ON WITH COMPRESSOR
DEFROST MODE	DEMAND	DEFROST MODE	DEMAND
DEFROSTS / DAY	5	DEFROSTS / DAY	5
1ST DEFROST DELAY	120 minutes	1ST DEFROST DELAY	120 minutes
DEFROST FAN STATE	OFF	DEFROST FAN STATE	ON
DEFROST TERM TEMP	50°F	DEFROST TERM TEMP	50°F
DEFROST PARAMETER	25 minutes	DEFROST PARAMETER	15 minutes
DRAIN TIME	2 minutes	DRAIN TIME	2 minutes
COMP RUN TIME	6 hours	COMP RUN TIME	6 hours
ELEC DEFROST MODE	PULSE	ELEC DEFROST MODE	PULSE
FAN DELAY TEMP	20°F	FAN DELAY TEMP	20°F
MAX FAN DELAY TIME	2 minutes	MAX FAN DELAY TIME	2 minutes
PUMP DOWN TIME	2 minutes	PUMP DOWN TIME	2 minutes
MULTI AIR TEMP CTRL	WARMEST	MULTI AIR TEMP CTRL	WARMEST
HIGH TEMP ALARM OFFSET	10°F	HIGH TEMP ALARM OFFSET	10°F
HIGH TEMP ALARM DELAY	60 minutes	HIGH TEMP ALARM DELAY	60 minutes
LOW TEMP ALARM OFFSET	4°F	LOW TEMP ALARM OFFSET	4°F
LOW TEMP ALARM DELAY	10 minutes	LOW TEMP ALARM DELAY	10 minutes
DOOR ALARM DELAY	30 minutes	DOOR ALARM DELAY	30 minutes
DIG IN 1 MODE	DOOR	DIG IN 1 MODE	DOOR
DIG IN 1 STATE	CLOSED	DIG IN 1 STATE	CLOSED
DIG IN 2 MODE	DISABLED	DIG IN 2 MODE	DISABLED
DIG IN 2 STATE	CLOSED	DIG IN 2 STATE	CLOSED
DIG IN 3 MODE	DISABLED	DIG IN 3 MODE	DISABLED
DIG IN 3 STATE	CLOSED	DIG IN 3 STATE	CLOSED
2ND ROOM TEMP	-50°F	2ND ROOM TEMP	-50°F
SUCT PRES OFFSET	0.0 psig	SUCT PRES OFFSET	0.0 psig
SUCT TEMP PFFSET	0.0°F	SUCT TEMP PFFSET	0.0°F
AIR TEMP OFFSET	0.0°F	AIR TEMP OFFSET	0.0°F
COIL TEMP OFFSET	0.0°F	COIL TEMP OFFSET	0.0°F
AUX TEMP OFFSET	0.0°F	AUX TEMP OFFSET	0.0°F
TEMP UNITS	FAHRENHEIT	TEMP UNITS	FAHRENHEIT
AIR TEMP DIFF	1°F	AIR TEMP DIFF	1°F

Table 3 - Controller Menus and Menu Parameters

Manual Menu

Parameter Name	Description	Range	Default
MANUAL CONTROL	Force the controller into the next operating mode	REFRIGERATE, OFF, DEFROST, DRIP TIME, FAN DELAY	
MANUAL VALVE	Manually open or close the EEV in percentage increments	1% increment	
CLEAR ALARMS	Clear all active alarms		
MANUAL COMPRESSOR RELAY	Manually energize or de-energize liquid line solenoid /compressor relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
MANUAL DEFROST RELAY	Manually energize or de-energize defrost relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
MANUAL FAN RELAY	Manually energize or de-energize evaporator fan relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
DHCP	ADVANCED TOPIC, SEE USER GUIDE: Selects appropriate DHCP mode	OFF, CLIENT, SERVER	OFF
FACTORY RESET	Reset the controller to the factory default setpoints	RESET	

Variables Menu - Non Adjustable (view only)

Parameter Name	Description
ROOM TEMP	Room temperature as measured by the controller
COIL TEMP	Coil temperature as measured by the controller
SYSTEM MODE	Current operating status
SUPERHEAT	Superheat as calculated by the controller (requires suction pressure transducer and suction temperature sensor)
SUCTION PRESSURE	Suction pressure as measured by the controller
SUCTION TEMP	Suction temperature as measured by the controller
SATURATION TEMP	Saturation temperature as calculated by the controller
VALVE % OPEN	Percentage the EEV is open
AUX TEMP	Auxiliary Temperature (Taux) sensor reading as measured by the controller
COMPRESSOR RELAY	Current state of liquid line solenoid/compressor relay
DEFROST RELAY	Current state of the defrost relay
FAN RELAY	Current state of the evaporator fan relay
DIG 1 STATUS	Current status of the Digital Input #1
DIG 2 STATUS	Current status of the Digital Input #2
DIG 3 STATUS	Current status of the Digital Input #3
IP OCTET 1	The first three digits of the IP address
IP OCTET 2	The second three digits of the IP address
IP OCTET 3	The third three digits of the IP address
IP OCTET 4	The fourth three digits of the IP address
SUBNET MASK OCTET 1	The first three digits of the subnet mask address
SUBNET MASK OCTET 2	The second three digits of the subnet mask address
SUBNET MASK OCTET 3	The third three digits of the subnet mask address
SUBNET MASK OCTET 4	The fourth three digits of the subnet mask address
FIRMWARE VERSION	Current version of the firmware on the controller

Variables Menu Options for DIG IN MODE

DIG IN Setting	Status Displayed on Controller
DIG IN MODE = DISABLED	DISABLED
DIG IN MODE = 2ND (ROOM) TEMP	inactive = 2ND ROOM TEMP OFF; active = 2ND ROOM TEMP ON
DIG IN MODE = DOOR SWITCH	inactive = DOOR CLOSED; active = DOOR OPEN
DIG IN MODE = EXT ALARM	inactive = NO ALARM; active = EXT ALARM (x)
DIG IN MODE = SYSTEM OFF	inactive = SYSTEM ON; active = SYSTEM OFF
DIG IN MODE = LIGHT SWITCH	inactive = LIGHTS OFF; active = LIGHTS ON
DIG IN MODE = CAMERA SWITCH	inactive = CAMERA OFF; active = CAMERA ON

Alarms Status Menu Non Adjustable (view only)

Parameter Name	Description
NO ALARM	No alarms active, everthing is running correctly
PRESSURE SENSOR	Suction pressure sensor is shorted, open or pressure out of range
SUCTION TEMP SENSOR	Suction temperature sensor is shorted or open
AIR TEMP SENSOR	Return air temperature sensor is shorted or open
COIL TEMP SENSOR	Coil temperature sensor is shorted or open
AUX TEMP SENSOR	Auxiliary temperature sensor is shorted or open
HIGH SUPERHEAT	Superheat above upper limit
LOW SUPERHEAT	Superheat below lower limit
HIGH AIR TEMP	Room temperature is above **ROOM TEMP + AIR TEMP DIFF + HIGH TEMP ALARM OFFSET** for longer than **HIGH TEMP ALARM DELAY**
LOW AIR TEMP	Room temperature is below **ROOM TEMP - LOW TEMP ALARM OFFSET** for longer than **LOW TEMP ALARM DELAY**
EXCESS DEFROST	Three consecutive defrosts with less than a one hour interval between each defrost
DEFR TERM ON TIME	Defrost terminated on time instead of temperature for two consecutive cycles
DOOR SWITCH	If door is open and room temperature is 5 degrees above **ROOM TEMP + AIR TEMP DIFF** for **DOOR ALARM DELAY** time
COMMUNICATION ERROR	ONLY FOR BONDED CONTROLLERS: No communication between controllers for one minute or more
EXT ALARM	If **DIG IN** (**1, 2** and/or **3**) **MODE** = EXT ALARM: The digital input is in an active state

Setpoints Menu

	Parameter Name	Description
	ROOM TEMP	Room temperature to be maintained
	DEFROST TYPE	Method of defrost used on the evaporator coil: Electric, Air, Hot Gas with Liquid Line Solenoid/Compressor relay off, Hot Gas with Liquid Line Solenoid/compressor relay on
	VALVE TYPE	Type of valve used on the system: mechanical, pre-configured electric, custom EEV configuration
Custom EEV Only	**MOTOR TYPE**	If **VALVE TYPE** = CUSTOM: The motor type used in the valve
Custom EEV Only	**MOTOR STEP RATE**	If **VALVE TYPE** = CUSTOM: The motor speed setting in number of steps per second
Custom EEV Only	**MAX VALVE STEPS**	If **VALVE TYPE** = CUSTOM: The total number of steps required to move the valve from closed to fully open
	SUPERHEAT	The superheat value that the controller will maintain, (not applicable if **VALVE TYPE** = MECHANICAL)
	MAX OPERATING PRES	The maximum allowable suction pressure, (not applicable if **VALVE TYPE** = MECHANICAL)
	REFRIGERANT	The type of refrigerant used in the refrigeration system
	AUX TEMP MODE	Configuration mode of the auxiliary temperature sensor
	AUX RELAY MODE	Configuration mode of the auxiliary relay.
	MIN COMP RUN TIME	Minimum amount of time the liquid line solenoid/compressor relay must remain on after it is energized
	MIN COMP OFF TIME	Minimum amount of time the liquid line solenoid/compressor relay must remain off before it can be energized again.
	REFRIG FAN MODE	Fan operation while in refrigeration mode
	DEFROST MODE	The method the controller uses to determine when to initiate a defrost.
	DEFROSTS / DAY	If **DEFROST MODE** = SCHEDULED: The number of evenly spaced defrosts per day the controller will initiate.
	1ST DEFROST DELAY	If **DEFROST MOD**E = SCHEDULED: The amount of time from controller power up until the first defrost is initiated.
	DEFROST FAN STATE	Whether or not to run the evaporator fans during defrost
	DEFROST TERM TEMP	The temperature the coil sensor(s) must exceed in order to terminate defrost. The defrost relay is de-energized at this point.
	DEFROST PARAMETER	The maximum amount of time the defrost relay will be energized.
	DRAIN TIME	Time to be in drain mode (drip time)
	COMP RUN TIME	If **DEFROST MODE** = RUN TIME: The amount of time liquid line solenoid/compressor relay is energized before the next defrost is initiated.
	ELEC DEFROST MODE	If **DEFROST TYPE** = ELEC: Whether to leave the defrost relay energized during the defrost cycle or to utilize advanced defrost algorithm.
	FAN DELAY TEMP	After defrost, the coil sensor reading must fall below this temperature set point in order for the controller to resume normal fan operation.
	MAX FAN DELAY TIME	Maximum amount of time after defrost to resume normal fan operation.
	PUMP DOWN TIME	Minimum amount of time between de-energizing the liquid line solenoid/compressor relay and energizing the defrost relay.
	MULTI AIR TEMP CTRL	Select control method to use with multiple room temperature sensors
Bonded Controllers Only	**MULTI EVAP COOL**	Select type of multi evaporator control - options are synchronous or independent
Bonded Controllers Only	**MULTI EVAP DEFROST**	Select whether to have all bonded controllers initiate defrost mode at the same time or independently.
Bonded Controllers Only	**MULTI EVAP SENSOR**	Select whether or not to share room temperature, coil temperature and suction pressure sensor data with bonded controllers.
	HIGH TEMP ALARM OFFSET	The number of degrees above **ROOM TEMP** for a **HIGH TEMP ALARM** condition.
	HIGH TEMP ALARM DELAY	Minutes the room temperature must remain above **ROOM TEMP + HIGH TEMP ALARM OFFSET** before issuing a **HIGH TEMP ALARM**
	LOW TEMP ALARM OFFSET	The number of degrees below **ROOM TEMP** for a **LOW TEMP ALARM** condition.
	LOW TEMP ALARM DELAY	Minutes the room temperature must remain below **ROOM TEMP - LOW TEMP ALARM OFFSET** before issuing a **LOW TEMP ALARM**
	DOOR ALARM DELAY	If **DIG IN (1, 2** and/or **3**) **MODE** = DOOR SWITCH: The amount of time, in minutes, before an alarm condition is initiated if door is open and room temperature is 5 degrees above **ROOM TEMP + AIR TEMP DIFF**
	DIG IN 1 MODE	Sets the function of the digital input
	DIG IN 1 STATE	Sets whether the switch activates when opened or closed
	DIG IN 2 MODE	Sets the function of the digital input
	DIG IN 2 STATE	Sets whether the switch activates when opened or closed
	DIG IN 3 MODE	Sets the function of the digital input
	DIG IN 3 STATE	Sets whether the switch activates when opened or closed
	2ND ROOM TEMP	If **DIG IN (1, 2** and/or **3**) **MODE** = 2ND ROOM TEMP: This value becomes the **ROOM TEMP** setpoint when the digital input is active
	SUCT PRES OFFSET	An offset added or subtracted from the suction line pressure transducer reading to calibrate, if needed
	SUCT TEMP OFFSET	An offset added or subtracted from the suction temperature sensor reading to calibrate, if needed
	AIR TEMP OFFSET	An offset added or subtracted from the room temperature sensor reading to calibrate, if needed
	COIL TEMP OFFSET	An offset added or subtracted from the coil temperature sensor reading to calibrate, if needed
	AUX TEMP OFFSET	An offset added or subtracted from the auxiliary temperature sensor reading to calibrate, if needed
	TEMP UNITS	Units for temperature's display in °F or °C
	AIR TEMP DIFF	The number of degrees above **ROOM TEMP** before the controller will go into **REFRIGERATION** mode
	EXTREME TEMP DIFF	ADVANCED TOPIC: Call KE2 Therm for assistance

	Range	Default	Current
	-50°F to 90°F	-10°F	
	ELEC, AIR, HOT GAS COMP ON, HOT GAS COMP OFF	ELEC	
	MECHANICAL, KE2, SER/SEI 1 TO 20, SER B TO L, SEI 30, SEI 50, SEH, ETS12 TO 50, ETS100, ETS250/400, KV, CAREL, CUSTOM;	MECHANICAL	
	BIPOLAR, UNIPOLAR	BIPOLAR	
	30 to 400 steps/second	200 steps	
	200 to 6400 steps	1600 steps	
	5°F to 30°F	8°F	
	10 to 150 psig	150 psig	
	404A, R507, 407A, 407C, 422A, 422D, 134A, R22, R717, 438A, 408A, 409A, 410A,	404A	
	DISABLED, MONITOR, 2ND AIR TEMP, 2ND COIL TEMP	DISABLED	
	ALARM RELAY, 2 SPEED FAN CTL, 2ND COMP RELAY, 2ND FAN RELAY, 2ND DEFR RELAY, LIGHT RELAY, CAMERA RELAY	ALARM RELAY	
	0 to 15 minutes	2 minutes	
	0 to 15 minutes	5 minutes	
	ON WITH COMPRESSOR, PERMANENT, CYCLE	ON WITH COMPRESSOR	
	DEMAND, SCHEDULED, RUN TIME	DEMAND	
	0 to 8	5	
	0 to 240 minutes	120 minutes	
	ON/OFF	OFF if **DEFROST TYPE** = ELEC, HOT GAS COMP ON, HOT GAS COMP OFF ON if **DEFROST TYPE** = AIR	
	35°F to 90°F	50°F if **DEFROST TYPE** = ELEC, HOT GAS COMP ON, HOT GAS COMP OFF 40°F if **DEFROST TYPE** = AIR	
	0 to 90 minutes	25 minutes if **DEFROST TYPE** = ELEC 10 minutes if **DEFROST TYPE** = HOT GAS COMP ON, HOT GAS COMP OFF 40 minutes if **DEFROST TYPE** = AIR	
	0 to 15 minutes	2 minutes	
	0 to 24 hours	6 hours	
	PULSE, PERMANENT	PULSE	
	-40°F to 35°F	20°F	
	0 to 20 minutes	2 minutes	
	0 to 10 minutes	0 minutes	
	AVERAGE, WARMEST	WARMEST	
	SYNC, INDEPENDENT	SYNC	
	SYNC, INDEPENDENT	SYNC	
	SHARED, NOT SHARED	SHARED	
	0°F to 99.9°F	10°F	
	0 to 120 minutes	60 minutes	
	0°F to 20°F	4°F	
	0 to 30 minutes	10 minutes	
	0 to 180 minutes	30 minutes	
	DISABLED, 2ND ROOM TEMP, DOOR SWITCH, EXT ALARM, SYSTEM OFF	DOOR	
	OPEN, CLOSED	CLOSED	
	DISABLED, 2ND ROOM TEMP, DOOR SWITCH, EXT ALARM, SYSTEM OFF	DISABLED	
	OPEN, CLOSED	CLOSED	
	DISABLED, 2ND ROOM TEMP, DOOR SWITCH, EXT ALARM, SYSTEM OFF, LIGHT SWITCH, CAMERA SWITCH	DISABLED	
	OPEN, CLOSED	CLOSED	
	-50°F to 90°F	-50°F	
	-5.0 to 5.0 psig	0.0 psig	
	-5.0°F to 5.0°F	0.0°F	
	-5.0°F to 5.0°F	0.0°F	
	-5.0°F to 5.0°F	0.0°F	
	-5.0°F to 5.0°F	0.0°F	
	FAHRENHEIT/CELSIUS	FAHRENHEIT	
	0°F to 25°F	1°F	

Table 4 - Defrost Defaults

Setpoint	Electric	Air	Hot Gas
Defost Fan State:	Off	On	Off
Defrost Termination Temperature Setpoint:	50	40	50
Maximum Defrost Time	30	45	15
Electric Defrost Mode:	Pulse	Permanent	Permanent

Communication

The KE2 Evap uses standard TCP/IP communication. The controller is equipped with an RJ-45 female connector to connect to Ethernet cable.

To communicate with the controller, the user will use a web browser to see the KE2 MasterView. The information is stored on the controller, so special software is not required.

A standard Ethernet cable should be used between the peripheral device and the controller. One end is connected to the controller, and the other to the Ethernet port on the PC or MasterView. The Ethernet port will look similar to a telephone jack. The difference is the Ethernet port is larger with 8 wires instead of 6.

In installations where multiple evaporators are piped to a single condenser, networking the controllers is required. This prevents damage to the system by synchronizing the defrost cycles. Networked controllers have an additional safety layer to protect the system. When networked, the controllers share information, such as air temperature, to allow a controller in alarm mode to continue to provide refrigeration until the system is serviced.

When networking multiple controllers an ethernet switch or router is required. KE2 Network Router is available in a 4-port and KE2 Switch in an 8-port model. The KE2 Router includes wireless access. The 8-port switch should be used for larger networks. Multiple switches can be ganged together to create additional ports for the network. When necessary, the local Network Adminstrator should be contacted to facilitate the network installation.

Table 5 - Ethernet Specifications Summary

Specifications	Ethernet - Unshielded Twisted Pair (UTP)
Topology	star
Network Friendly	YES
Maximum Cable Length	330 feet (copper)
Maximum Data Rate	1,000 mbs
Native Internet	YES
Supported Devices	thousands
Response Time	milliseconds

For additional information on Ethernet Cable, consult IEEE 802.

Table 6 - Specifications

Controller	
Input Voltage:	120V or 208 - 240V
Ambient Temp:	-40° to 140°F
Operating Temp:	-40° to 140°F
Display:	4-digit alphanumeric LED
IP Rating:	IP65
Inputs:	(4) temperature sensors (KE2 SKU 20200)
	(1) pressure transducer (KE2 SKU 20204)
Valve Types:	unipolar and bipolar stepper motors (12V) (Beacon® is 21V)
Relays:	20A resistive (defrost) 10A inductive (evaporator fan)
	(2) 3A inductive rated cycles
Digital Input 1 & 2:	door contact, use 2nd air temp setpoint, disabled, system off, external alarm notification
Digital Input 3	door contact, use 2nd air temp setpoint, disabled, system off, external alarm notification, **lights, camera**
Communication:	Standard TCP/IP
Pressure Transducer	
Pressure Range:	0 to 150 psia
Proof Pressure:	450 psi
Burst Pressure:	1500 psi
Operating Temp:	-40° to 275°F
Temperature Sensor	
Sensor Specs:	-60° to 150°F moisture resistant package

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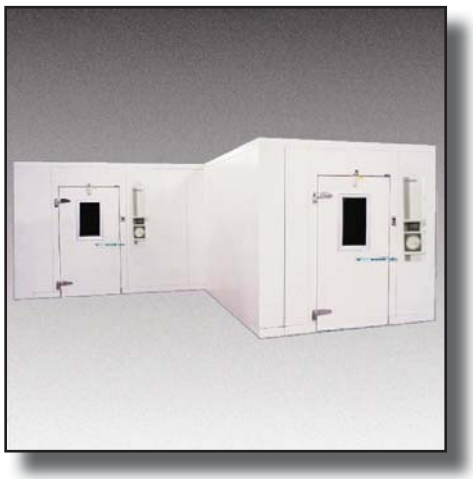
Environmental Rooms and Stability Chambers

A wide selection of temperature and humidity controls custom designed to meet your needs.



NORLAKE SCIENTIFIC®

Committed to our environment

ENVIRONMENTAL ROOMS / STABILITY CHAMBERS

SPECIFICATIONS

Controlled Temperature Chambers - Stability Rooms

Environmental Rooms/Stability Chambers from Nor-Lake Scientific reproduce and closely monitor any environment with a precise combination of humidity, temperature and light. Choose a multi-temperature or constant temperature room. Environmental rooms are customized to meet your testing and storage needs.

Options

- Microprocessor based controls with accuracies to +/-0.15°C
- Optional Humidification/ Dehumidification/Lighting
- Modular construction for ease of installation and relocation
- Alarms, monitors, temperature recorders and other performance options
- LED lighting

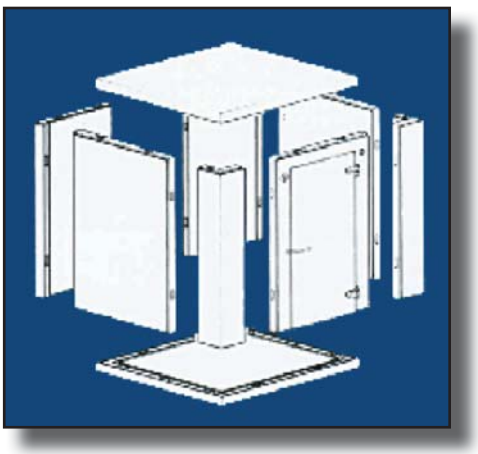
Multiple Applications

- Pharmaceutical Research and Development
- Drug Stability and Shelf Life Testing
- Plasma and Blood Storage
- Clinical Research
- Environment Simulation Testing
- Working Laboratories
- Biological Research
- Electronic Stress Testing

Modular Construction

Nor-Lake Scientific rooms are constructed using 100% foamed-in-place polyurethane insulation expanded with HFC-245fa which is CFC and HCFC free. The foam is bonded by an adhesive to the interior and the exterior metal pan skins and heat cured for life long stability. The “R” value of the panels shall be a minimum of 25 for coolers and 32 for freezers.

The panel joints are precisely formed using male and female tongue and groove with complete perimeter gasketing and cam action fasteners to provide a tight seal. The construction meets the UL flame spread rating and NSF sanitation approvals. The rooms can be provided in a variety of metal types and finishes. Nor-Lake Scientific will construct a room of any size to meet your needs.



SPECIFICATIONS

Controls

A fully programmable microprocessor with a liquid crystal alphanumeric display provides a variety of data including temperature, humidity and alarms. This advanced control provides a +/- 0.15°C and +/- 1.0% accuracy. All set points are adjustable by the multi-function interface key pad. There are no dials, switches or multiple controls to manipulate. For safety purposes, the controller has a user password entry system with high/low audible and visual alarms for temperature, humidity, power failure, sensor failure and other alarms tailored to meet your needs.

Service prompts indicate service times and maintenance information. Our programmable features allow you to control temperature, humidity and lights based on real time. The system includes expansion slots for communication interface to operate or monitor the entire system via a host computer. The control is mounted behind a key locked door with a molded acrylic cover protecting the controls from damage. All high voltage components are factory wired and are located in a NEMA 1/UL approved line voltage enclosure for added safety. An optional 10" circular chart recorder can be added to record seven days of temperature and humidity history. Optional Touch Screen HMI (Human Machine Interface) Programmable Control with graphical display and charting features.

Refrigeration

Nor-Lake Scientific refrigeration systems are designed for optimal temperature uniformity and minimal energy use. Continuous operation by use of hot gas by-pass provides close control of room temperature and greater efficiency. For maximum uniformity, an optional electronic proportional valve receives input from the programmable microprocessor control to vary capacity based on changes in load conditions. These factory assembled refrigeration systems include high/low pressure controls, receiver, sight glass, liquid line dryer, suction accumulator, vibration eliminators, expansion valves and other equipment required to achieve tight temperature tolerances. Outdoor units are complete with all weather hoods and winterized controls.

- Wall or ceiling mounted systems
- Indoor or outdoor models
- Temperatures: +4°C, -20°C, -30°C, -40C, +2°C to +93.3°C
- Optional Remote Capsule Pak™ Systems
- UL and CSA listed

Heating

Chrome steel sheath heaters with large finned area provide faster heat transfer and longer element life. All heating circuits have two safety shutdowns for maximum safety.

Dehumidification

A rotary bed dehumidifier using absorbent desiccant in conjunction with the application of heat reduces the grain moisture of the air. Portions of the walk-in are ducted to the dehumidifier for moisture reduction. This air is then returned to the chamber after being conditioned by the refrigeration system.

Humidification

Nor-Lake Scientific offers three types of humidification methods, selecting the most efficient and economical method to meet your specifications.

1. ***Steam Generator:*** With a stainless steel vaporizing chamber with welded seams, incoloy alloy sheathed resistance heaters and use a dripless stainless steel dispersion tube containing calibrated orifices to provide uniform humidity distribution.
2. ***Spray System:*** Relative humidity is induced by a highly efficient atomizing spray system with a stainless steel self cleaning nozzle.
3. ***Centrifugal Atomizer:*** This system incorporates a sealed motor and copper reservoir distributing humidification through centrifugal force.
4. ***Ultrasonic Atomizer:*** Highly efficient with no added heat, Completely welded stainless steel atomizer tank, Instant on/off for tight humidity control, Mountable interior or exterior

ENVIRONMENTAL ROOMS / STABILITY CHAMBERS

SPECIFICATIONS

Conditioning Systems

Ceiling Plenum: Consists of a diffusion grating made of high grade injection molded acrylic with multiple open cells installed below the ceiling panels provides a positive pressure air plenum extending across the entire room ceiling. All the lighting and air handling equipment consisting of evaporator coils, heater and drain pans are above this positive pressure plenum to allow light and conditioned air to be diffused uniformly into the room.

Wall and Ceiling Plenum: Consists of the ceiling plenum described above with an added vertical wall plenum. This provides air return through the floor of the chamber and into the conditioning system, assuring no stratification of air at the floor level.

Both plenums improve the temperature uniformity within the room. The ceiling plenum is the most commonly used method providing maximum storage space.

Lighting

Nor-Lake Scientific rooms utilize high output cool white fluorescent lamps or optional LEDS to provide consistent, uniform lighting. The lamps are provided with low temperature ballasts and are mounted in vapor proof gasketed UL fixtures, made of cast aluminum with Lexan globes. Typical lighting provides a light intensity of 70 foot candles when measured 40 inches above the floor at the specified operating temperature. Special lighting is available with a variety of programmable features.

Shelving

Both Free-Standing and Cantilevered Shelving is available. Cantilevered Shelving is completely adjustable, wall mounted and available in 16 gauge galvanized steel, .064 smooth aluminum or 16 gauge stainless steel. The shelves can be specified in 3, 4, 5 or 6 tiers and are completely sanitary having no folds, hems or crevices. Shelf widths are available in 10 inches, 20 inches, 22 inches and 24 inches.

Free-Standing Adjustable Wire Shelving is made of high quality wire and steel. Provided in Electro-Zinc plate, electrostatically applied epoxy and type 302 stainless steel. Available in 12 inches, 18 inches and 24 inches with 3, 4, 5 or 6 tiers.

Warranty

Warranty assures the product is free from defects in material or workmanship under normal use and service. The coverage includes a 15 year insulated panel warranty, five year compressor warranty and 18 months parts and labor warranty.

For Environmental Rooms built to your specifications, contact Nor-Lake Scientific at 800-477-5253.

727 Second Street
PO Box 248
Hudson, Wisconsin 54016
800-477-5253
715-386-2323
800-388-5253 Service/Parts
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NORLAKE SCIENTIFIC

Revision Date: 05/14

Printed in the U.S.A.
Part Number: 077438

NL708 (XWA11V)
Walk-In Temp / Door /Alarm / Light Module

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Operating Instructions Alarm/Light Module XWA11V

XWA11V
Walk-In Temp / Door /Alarm / Light Module

1. GENERAL DESCRIPTION

Model **XWA11V, 100x64 mm** format, is a microprocessor-based controller, suitable for temperature monitoring and alarming in a walk-in cooler or freezer. It is provided with two (2) Relay Contacts to control lights and an external alarm. It is provided with one (1) NTC probe input for temperature measurement. The unit has 2 Digital Inputs, one for a Door Switch and the 2nd as an optional Panic Switch. See the catalog for optional accessories. One 5Pin Input allows the user to program the parameter list with a **"Hot Key" (see section 9)**

Note: The default settings are listed in the back of this manual. They are set for Coolers (Medium Temp). For Freezers (Low Temp) you MUST Change the ALL and ALU settings. See Section 4.0

2. GENERAL WARNINGS

2.1 ⚠ PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept close to the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.

Note: If equipped with a battery backup, the battery must be installed after the walk-in has reached its operating temperature.

2.2 ⚠ SAFETY PRECAUTIONS

- Check if the supply voltage is correct before connecting the instrument.
- Do not expose the back of the instrument to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent the formation of condensation.
- Warning: disconnect all electrical connections before performing any maintenance operation.
- Fit the probe where it is not damaged by the end-user. The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor (see address) with a detailed description of the fault.
- Consider the maximum current that can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining, or you may get bad temperature readings.
- Be sure to seal any J-box with RT sealant to prevent cold and moisture intrusion.

Operating Instructions Alarm/Light Module XWA11V

3. INTERFACE

3.1 KEY FRONT PANEL OPERATION

set — In Programming Mode press to **select** a parameter or to **confirm** an operation.
Press and hold this key for more than 5 s **to turn the controller OFF.**
Press and hold this key for more than 1 s **to turn the controller back ON.**

HIGH — Press to see the HIGH Temp ALARM (**ALU** parameter)

LOW — Press to see the LOW Temp ALARM (**ALL** parameter)

In Programming Mode press to browse parameter codes.
Press to increase the displayed value.
Press to mute the buzzer (+ relay) when an ALARM is happening.
Hot key programming: with the instrument on, insert the hot key and then press the UP button.

In Programming Mode press to browse parameter codes.
Press to decreases the displayed value.

Switch ON and OFF the light of the cold room

KEY COMBINATIONS: PRESS SIMULTANEOUSLY

+ — To lock and unlock the Keyboard.

set + — To enter the Programming Mode.

set + — To exit the Programming Mode.

set + HIGH — To enter a new value for the HIGH Temp ALARM (**ALU**).

set + LOW — To enter a new value for the LOW Temp ALARM (**ALL**).

3.2 USE OF LEDS

Each LED function is described in the following table:

LED	MODE	Function
	ON	ALARM signaling
	ON	The light is on
°C	ON	Celsius degrees operation
°F	ON	Fahrenheit degrees operation

4. TEMP ALARM SETTINGS

4.1 HOW TO SET THE MIN TEMPERATURE ALARM

- **To modify the minimum (LOW)** Temp **ALARM:** hold the set + LOW keys pressed for 3 s until the minimum Temp alarm is displayed.
- Change the value using the **UP** and **DOWN** keys.
- Press the **SET** key to confirm the new value and exit.

4.2 HOW TO SET THE MAX TEMPERATURE ALARM

- **To modify the max (HIGH) Temp ALARM:** hold the set + HIGH keys pressed for 3 s until the max Temp alarm is displayed.
- Change the value using the **UP** and **DOWN** keys.
- Press the **SET** key to confirm the new value and exit.

5. PROGRAMMING

5.1 HOW TO CHANGE A PARAMETER VALUE MAIN MENU

1. Enter the Programming Mode by pressing the **SET** and **DOWN** key for **3s** (and will start blinking).
2. Select the required parameter. By using the **UP or DOWN** KEY
3. Press the "**SET**" key to display its value (now only the LED is blinking).
4. Use "**UP**" or "**DOWN**" to change its value.

Press "**SET**" to store the new value and move to the following parameter.
To exit: Press **SET + UP** or wait 15 s without pressing a key.
NOTE: the set value is stored even when the procedure is exited, by waiting the time-out to expire.

5.2 THE HIDDEN MENU (PR2)

The hidden menu includes all the parameters of the instrument.

5.2.1 HOW TO ENTER THE HIDDEN MENU (PR2)

1. Enter the Programming Mode by pressing the Set + **down** key for **3s** (and starts blinking).
2. When a parameter is displayed, **release and re-press** the **SET + down** for more than **7s**.
3. The **Pr2** label will be displayed immediately followed from the HY parameter. **NOW YOU ARE IN THE HIDDEN MENU.**
4. **Select** the required parameter as above
5. Press the "**SET**" key to display its value (Now only the LED is blinking).
6. Use "**UP"** or "**down"** to change its value.
7. Press "**SET**" to store the new value and move to the following parameter.

To exit: Press **SET + up** or wait **15s** without pressing a key.
NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

5.2.2 HOW TO MOVE A PARAMETER FROM THE HIDDEN MENU TO THE FIRST LEVEL AND VICEVERSA

Each parameter present in the HIDDEN MENU can be removed or put into "THE FIRST LEVEL" (user level) by pressing **"SET + down"**.
In HIDDEN MENU when a parameter is present in First Level the **decimal point LED is on**.

5.3 HOW TO LOCK THE KEYBOARD

1. Keep pressed for more than **3s** the **UP** and **DOWN** keys.
2. The "**POF**" message will be displayed and the keyboard will be **locked**. At this point it will be possible only to see the Set Point or the MAX or MIN Temp stored
3. If a key is pressed more than **3s** the "**POF**" message will be displayed.

5.4 TO UNLOCK THE KEYBOARD

Keep pressed together for more than **3s** the **UP** and **DOWN** keys. The **"PON"** message is displayed

6. LIGHT MANAGEMENT

6.1 TIMED REGULATION: I1L = Y

With **i1L = y** the light remains on at least for the **LHt** parameter.
The **LHt** timer is re-initialized every time the light button is pushed.
With **LHt=0** the light remains on until the light button is pushed again.

The light is switched on every time one of the following conditions happens:

- the door is open (**i1F = dor**)
- the presence sensor is activated (**i2F = LHt**)
- the light button is pushed

The light is switched off when all the following conditions happen:

- the **LHt** timer is exhausted
- the door is closed (**i1F = dor**)
- the presence sensor is de-activated (**i2F = LHt**)
- Light button regulation: i1L = n

The lights will flash (for 2 minutes) every 20 seconds for the **FLH** time (0-5 min) at the end of the **LHt** time as a warning that the lights are about to turn off (for incandescent and LED lights only).

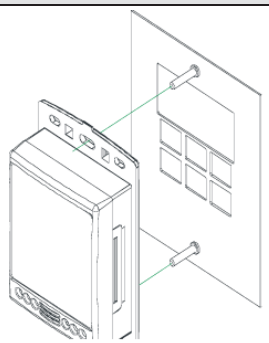
The **light button has a higher priority than digital inputs** therefore:
- if the light was switched on by button the digital input can not modify its status.
- if the light was switched on by digital input, the light button can modify its status.

7. INSTALLATION AND MOUNTING

7.1 MOUNTING OF XWA11V – PR10000

The **XWA11V** must be mounted on vertical panel, in a J-Box (Steel City PN 68371-1/2) or equal or wall mounted using an appropriate enclosure.

The Ambient Temp range for correct operation is 32 – 131°F (0-55°C). Avoid installation in places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes.



8. ELECTRICAL CONNECTIONS

The instrument is provided with ¼" fast-on terminal blocks to connect cables with a cross section up to .110" for the digital and analog inputs. Relays and power supply have a Fast-on connection (.250"). For supply connections, use 14 AWG or larger copper or CU wire only rated at least 90˚C (194˚F). Before connecting cables make sure the power supply complies with the instrument requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay and in case of heavier loads use a suitable external relay.
N.B. Maximum current allowed for all the loads is 15A.

8.1 PROBE CONNECTIONS

The probe shall be mounted with the bulb upwards to prevent damages due to casual liquid infiltration. It is recommended to place the thermostat probe away from air streams to correctly measure the average room temperature. The probe can be extended up to 300 ft. Check calibration when running long lengths over 100ft.

9. USE OF THE PROGRAMMING "HOT KEY "

9.1 HOW TO PROGRAM A HOT KEY FROM THE INSTRUMENT (UPLOAD)

1. Program one controller with the front keypad.
2. When the controller is ON, insert the "**Hot key**" and push **UP** key; the **"uPL"** message appears followed a by flashing **"End"**
3. Push "**SET"** key and the **End** will stop flashing.
4. Turn OFF the instrument remove the **"Hot Key",** then turn it ON again.

NOTE: the "**Err**" message is displayed for failed programming. In this case push UP key again if you want to restart the upload again or remove the "**Hot key**" to abort the operation.

9.2 HOW TO PROGRAM AN INSTRUMENT USING A HOT KEY (DOWNLOAD)

1. Turn OFF the instrument.
2. Insert a **programmed "Hot Key" into the 5 PIN receptacle** and then turn the Controller ON.
3. Automatically the parameter list of the **"Hot Key"** is downloaded into the Controller memory, the "**doL**" message is blinking followed a by flashing **"End".**
4. After 10 seconds the instrument will restart working with the new parameters.
5. Remove the **"Hot Key".**

NOTE the message "**Err**" is displayed for failed programming. In this case turn the unit off and then on if you want to restart the download again or remove the "**Hot key**" to abort the operation.

10. ALARM SIGNALS

Message	Mode	Cause	Outputs
"P1"	Flashing	Probe failure	Alarm output ON
"PoF"	Flashing (3s)	Keyboard locked	Not changed
"Pon"	Flashing (3s)	Keyboard un-locked	Not changed
"HA"	Alternated with temp	Maximum T° alarm	Alarm output ON;
"LA"	Alternated with temp	Minimum T° alarm	Alarm output ON;
"dA"	Alternated with temp	Door switch alarm	Alarm output ON;
"EA"	Alternated with temp	External alarm	Alarm output ON;
"PAn"	Alternated with temp	Serious external alarm	Alarm output ON;
dEF	Alternated with temp	Defrost is running	Not changed

The alarm message is displayed until the alarm condition is reset.

10.1 SILENCING BUZZER

Once the alarm signal is detected the buzzer can be silenced by pressing the **UP** key.

10.2 ALARM RECOVERY

Probe alarms: "**P1**" (probe1 faulty), "**P2**"; they automatically stop 10s after the probe restarts normal operation. Check connections before replacing the probe.

T° alarms "**HA**" and "**LA**" automatically stop as soon as the thermostat T° returns to normal values or when the defrost starts.

Door switch alarm "**dA**" stops as soon as the door is closed.

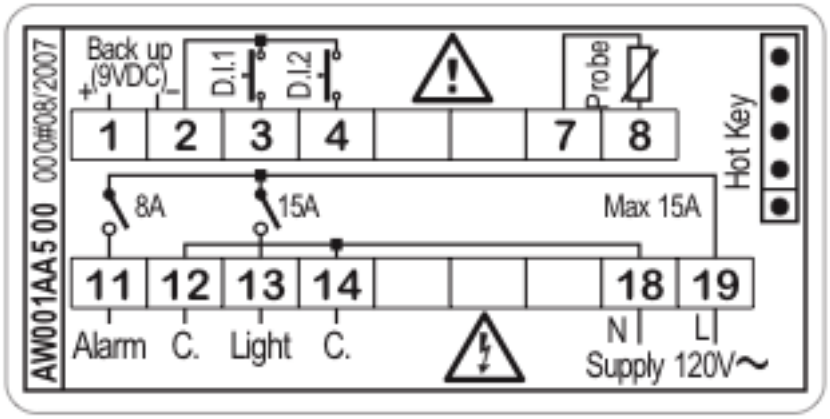
External alarms "**EAL**", "**BAL**" stops as soon as the external digital input is disabled.

Operating Instructions Alarm/Light Module XWA11V

11. TECHNICAL DATA

Housing: self extinguishing ABS
Case: face 100x64 mm; depth 45.5mm
Mounting: J-box or wall-mount in suitable enclosure
Frontal protection: IP65
Connections: ¼" fast-on for power, 1/8" fast-on for probes and Digital Inputs
Power supply: 120Vac ± 10%, optional 230Vac ± 10% MAX 15A
Power absorption: 4VA max.
Ambient Temperature: 32-131°F (0-55°C)
Display: 3 digits, red LED, 14,2 mm high.
Inputs: 1 NTC probe
Digital inputs: 2 free voltages
Relay outputs: Relay Contacts
Light: relay SPST 15A, 120Vac;
Alarm: relay SPST 8A, 120Vac
Other output: alarm buzzer
Data storing: on the non-volatile memory (EEPROM).
Measuring and regulation range:
NTC probe: -40÷110°C (-58÷230°F)
Resolution: 1 °F
Accuracy : ±1 °F

12. CONNECTIONS



Power supply: 120Vac +/- 10% 15A MAX current

13. PARAMETER MAP

LABEL	DESCRIPTION	VALUE	LEVEL	RANGE
ot	Thermostat probe calibration	0	Pr2	[-21°F - 21°F]
CF	Temperature measurement unit	F	Pr2	°C - °F
rES	Resolution (only for °C)	in	Pr2	dE - in
UT	Display update	60	Pr2	0 - 255 (sec.)
OnF	Off function enabling	y	Pr2	n - Y
ALU	High temperature alarm setting (med temp / low temp)	50 / 30	Pr1	ALL-302° F
ALL	Low temperature alarm setting (med temp / low temp)	30 / -20	Pr1	°-58 - ALU
AFH	Temperature alarm differential	2	Pr2	1°F - 45°F
ALd	Temperature alarm delay	30	Pr1	0 - 255 (min.)
dAo	Delay of temperature alarm at start-up	1.3	Pr2	0.0 - 24.0 Hrs.
EdA	Alarm delay at the end of defrost	30	Pr2	0 - 255 (min.)
dot	Delay of temperature alarm after closing the door	15	Pr2	0 - 255 (min.)
LHt	Light timer	15	Pr1	0 - 255 (min.)
FLH	Light Flashing Timer (time before light goes out that it will flash) (for incandescent & LED lights only)	2	Pr1	0 - 5 (Min)
doA	Open door alarm delay	15	Pr1	0 - 255 (min.)
oA1	First relay configuration	ALr	Pr2	ALr - LHt - OnF
oA2	Second relay configuration	LHt	Pr2	ALr - LHt - OnF
AOP	Alarm relay polarity	oP	Pr2	OP - CL
i1P	Digital input 1 polarity	CLoP	Pr2	OP - CL
i1L	Door switch to turn light ON	y	Pr2	n - Y
i1F	Digital input 1 operating mode	dor	Pr2	EAL - dor - dEr - LHt
i2P	Digital input 2 polarity	cL	Pr2	OP - CL
i2F	Digital input 2 operating mode	PAn	Pr2	EAL - Pan - dFr - LHt
did	Time interval/delay for digital input alarm	0	Pr2	0 - 255 (min.)
tbA	Alarm relay disabling	n	Pr2	n - Y
PbC	Kind of probe	ntc	Pr2	PtC - ntC
dP1	Real temperature Probe 1		Pr2	(probe value)
rEL	FW release		Pr2	read only
Ptb	Parameter map		Pr2	read only

14. PARAMETER LIST

Ot **Thermostat probe calibration:** (-12.0÷12.0°C/ -21÷21°F) allows to adjust possible offset of the thermostat probe.

CF **T measurement unit**: °C = Celsius; °F = Fahrenheit. When the measurement unit is changed the Set Point and the values of some parameters have to be modified.

rES **Resolution (for °C)**: (in = 1°C; dE = 0.1 °C) allows decimal point display.

Ut **Display update**: The time delay of the T readout (0÷255s)

onF **Off function enabling**: **n =** off function disabled; **y =** off function enabled;

ALU **High T° alarm setting**: (ALL ÷ 150°C or 302°F);
when this T° is reached and after the ALd delay time the HA alarm is enabled.

ALL **Low T° alarm setting**: (- 50°C or -58°F ÷ ALU)
when this T° is reached and after the ALd delay time, the LA alarm is enabled,.

AFH **T° alarm differential**: (0,1÷25,5°C; 1÷45°F) differential for T° alarm Set Point and fan regulation Set Point, always a positive value

ALd **T° alarm delay**: (0÷255 min) time interval between the detection of an alarm condition and the corresponding alarm signaling.

dAO **Delay of T° alarm at start-up**: (0min÷23h 50min) time interval between the detection of the T° alarm condition after the instrument power on and the alarm signaling.

EdA **Alarm delay at the end of** defrost: (0÷255 min) Time interval between the detection of the T° alarm condition at the end of defrost and the alarm signaling.

dot **Delay of T° alarm after closing the door**: (0÷255 min) Time delay to signal the T° alarm condition after closing the door.

LHt **Light timer**: (0-255 min) The time the light will stay on after pressing the light switch on the keyboard.

FLH **Light Flashing**: (0-5 min) The light will “double flash” every 20 seconds during the FLH time period before turning off after the LHt time. (For incandescent and LED lights only.)

doA **Open door alarm delay**:(0÷255 min) delay between the detection of the open door condition and its alarm signaling: the flashing message “dA” is displayed.

oA1 **First relay configuration: (14-15): ALr =** alarm; **LHt** = light; **onF =** on/off relay

oA2 **Second relay configuration: (14-16): ALr =** alarm; **LHt** = light; **onF =** on/off relay

AOP **Alarm relay polarity:** cL = closing contacts; oP = opening contacts.

i1P **Digital input 1 polarity (1-2)**: CL : the digital input is activated by closing the contact;
OP: the digital input is activated by opening the contact

i1L **Door switch to turn light ON(1-2):** (y / no) To turn the light ON automatically when the door is open. The light will turn off based on LHt . Keyboard switch must be turned ON first.

i1F **Digital input 1 operating mode(1-2): EAL** = external alarm; **dor** = door switch; **dFr** = A defrost is running; **LHt** = keep light ON (signal from occupancy sensor) override LHt.;

i2P **Digital input 2 polarity (1-3)**: CL : the digital input is activated by closing the contact;
OP: the digital input is activated by opening the contact

i2F **Digital input 2 operating mode**: configure the digital input function:
EAL = External alarm;
PAn =Panic alarm;
dFr = A defrost is running; (need external CT’s)
LHt = Keep light ON (signal from occupancy sensor) overrides LHt.

did **Time interval/delay for digital input alarm**:(0÷255 min.) If I2F=EAL or PAn (external alarms), “did” parameter defines the time delay between the detection and the successive signaling of the alarm.

tbA **Alarm relay & Buzzer disabling:** (**y** ; **no**)

Pbc **Type of probe (PTC, NTC)**

dP1 **Probe 1 T**

rEL **Software release** for internal use.

Ptb **Parameter table code:** read only.

QUICK SHEET
XWA11V Walk-in Alarm / Door / Alarm / Light Unit Operation Manual

In Normal Operation the Indicator will display the temperature. 36° F

CHECK ALARM SETPOINTS (Cooler HA = 50°F, LA = 30°F **/ Freezer** HA = 30°F, LA = -20°F**)**

To SEE the HIGH Alarm Set Point Press and release the HIGH Key, It will display the High Set Point for 5 seconds. The Temp alarm will go ON if the temp exceeds the Set Point after 15 minutes. The display will read HA alternating with the Temp.

To SEE the LOW Alarm Set Point Press and release the LOW Key it will display the Low Set Point for 5 seconds. The Temp alarm will go ON if the temp exceeds the Set Point after 15 minutes. LA, alternating with the Temp.

CHANGE ALARM SETPOINTS

1. To Change the HIGH Alarm Set Point Press BOTH the HIGH + set for 7 seconds and the LED above the will blink.
2. Release and scroll UP to adjust the Set Point up, or Scroll DOWN to adjust the Set point down.
3. Press set to confirm the change.
4. For Low Set Point repeat the procedure with the LOW + set

LIGHT OPERATION

Press the light switch to turn ON the inside light; it will automatically go OFF after 15 minutes.

DOOR SWITCH

If the door switch is used opening the door will automatically turn the light ON, and will automatically go OFF after 15 minutes.

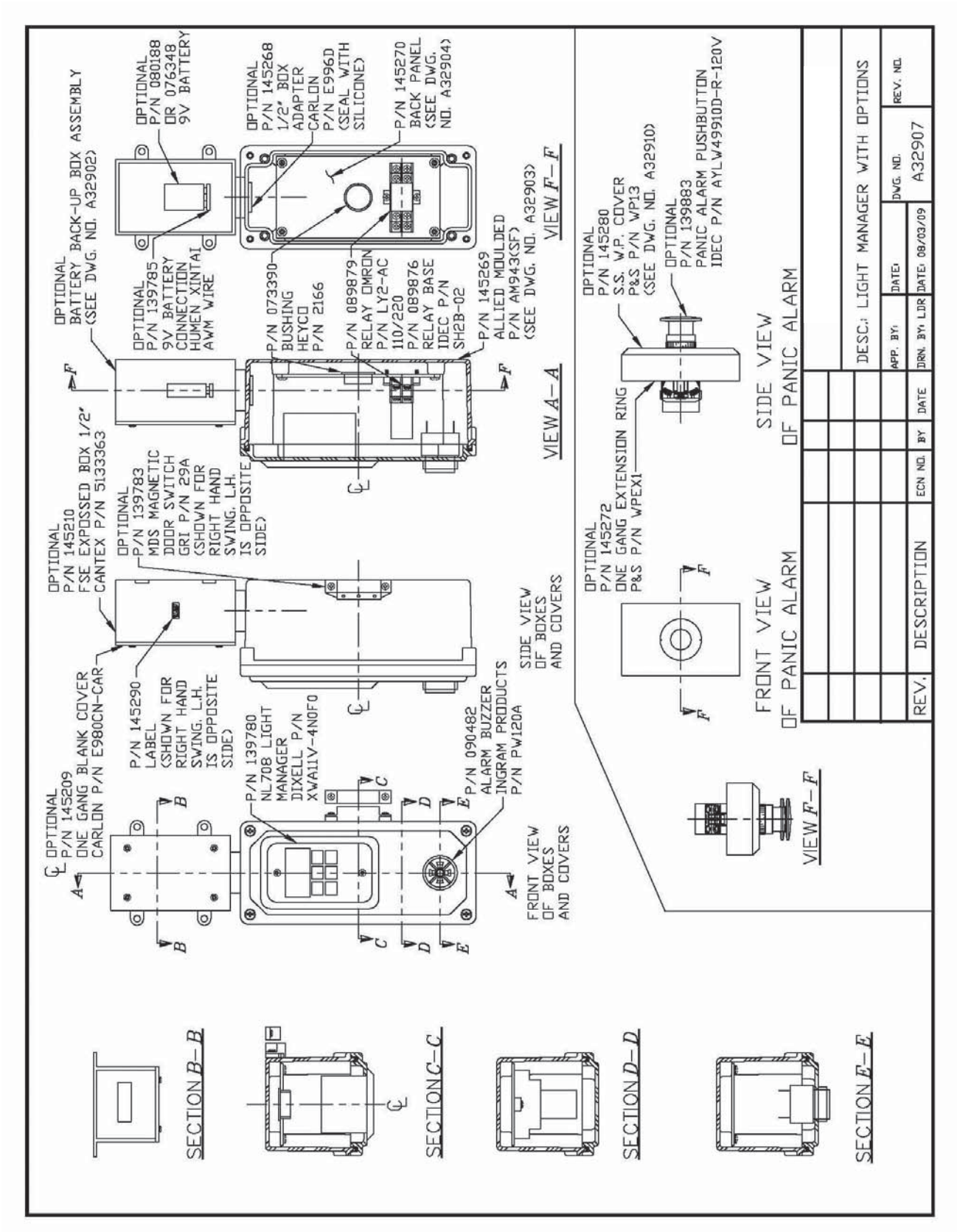
If the Door is left open longer than 15 minutes the DOOR Alarm will go off, dA alternating with the temperature reading.

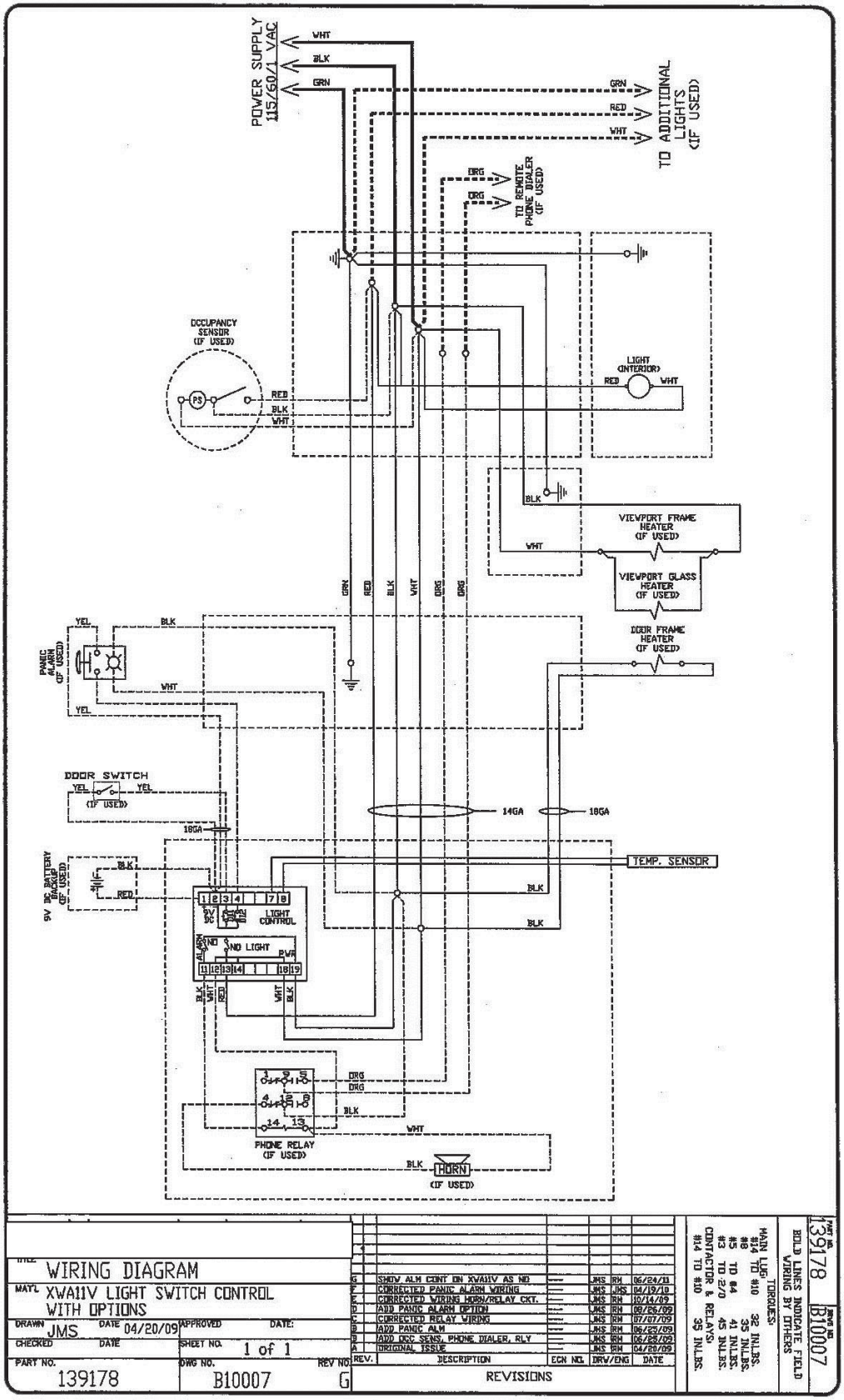
ALARM SIGNALS

P1	Flashing	PROBE FAILURE
HA	Alternated with temp	HIGH TEMP ALARM
LA	Alternated with temp	LOW TEMP ALARM
dA	Alternated with temp	DOOR OPEN ALARM
PAn	Alternated with temp	PANIC ALARM (need opt. panic switch)

Walk-In Alarm System Parts List

NOR-LAKE P/N	Description
139780	XWA11V Walk-In Alarm Module
145288	5 Foot Probe
139807	30 Foot Probe
139783	MDS Magnetic Door Switch – Door Open Alarm
090482	EXT/BUZ Alarm Buzzer
139809	'iDial2' Two Zone Phone Dialer
089879	Relay for 'iDial2'
139883	PAN Panic Alarm Switch
139785	9V Battery Holder
145267	Occupancy Sensor
089876	Relay Base
142469	Remote 2 x 4 Buzzer Box (includes buzzer)
080188	Battery, 9V, Alkaline


OPTIONAL P/N 145209 ONE GANG BLANK COVER CARLON P/N E980CN-CAR
OPTIONAL P/N 145210 FSE EXPOSSED BOX 1/2" CANTEX P/N 5133363
OPTIONAL BATTERY BACK-UP BOX ASSEMBLY (SEE DWG. NO. A32902)
OPTIONAL P/N 080188 OR 076348 9V BATTERY
OPTIONAL P/N 139785 9V BATTERY CONNECTION HUMEN XINTAI AWM WIRE
OPTIONAL P/N 145268 1/2" BOX ADAPTER CARLON P/N E996D (SEAL WITH SILICONE)
P/N 145270 BACK PANEL (SEE DWG. NO. A32904)
P/N 073390 BUSHING HEYCO P/N 2166
P/N 089879 RELAY OMRON P/N LY2-AC 110/220
P/N 089876 RELAY BASE IDEC P/N SH2B-02
P/N 145269 ALLIED MOULDED P/N AM943(SF) (SEE DWG. NO. A32903)
OPTIONAL P/N 139783 MDS MAGNETIC DOOR SWITCH GRI P/N 29A (SHOWN FOR RIGHT HAND SWING. L.H. IS OPPOSITE SIDE)
P/N 145290 LABEL (SHOWN FOR RIGHT HAND SWING. L.H. IS OPPOSITE SIDE)
P/N 139780 NL708 LIGHT MANAGER DIXELL P/N XWA11V-4N0F0
P/N 090482 ALARM BUZZER INGRAM PRODUCTS P/N Pw120A
OPTIONAL P/N 145272 ONE GANG EXTENSION RING P&S P/N WPEX1
OPTIONAL P/N 145280 S.S. W.P. COVER P&S P/N WP13 (SEE DWG. NO. A32910)
OPTIONAL P/N 139883 PANIC ALARM PUSHBUTTON IDEC P/N AYLW49910D-R-120V
VIEW A-A
VIEW F-F
SIDE VIEW OF BOXES AND COVERS
FRONT VIEW OF BOXES AND COVERS
SIDE VIEW OF PANIC ALARM
FRONT VIEW OF PANIC ALARM
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
DESC.: LIGHT MANAGER WITH OPTIONS
APP. BY: DATE: DWG. NO. A32907 REV. NO.
DRN. BY: LDR DATE: 08/03/09
REV. DESCRIPTION ECN NO. BY DATE



TITLE: WIRING DIAGRAM					
MAT'L: XWA11V LIGHT SWITCH CONTROL WITH OPTIONS					
DRAWN: JMS	DATE: 04/20/09	APPROVED	DATE:		
CHECKED	DATE	SHEET NO.: 1 of 1			
PART NO.: 139178	DWG NO.: B10007	REV NO.: G			

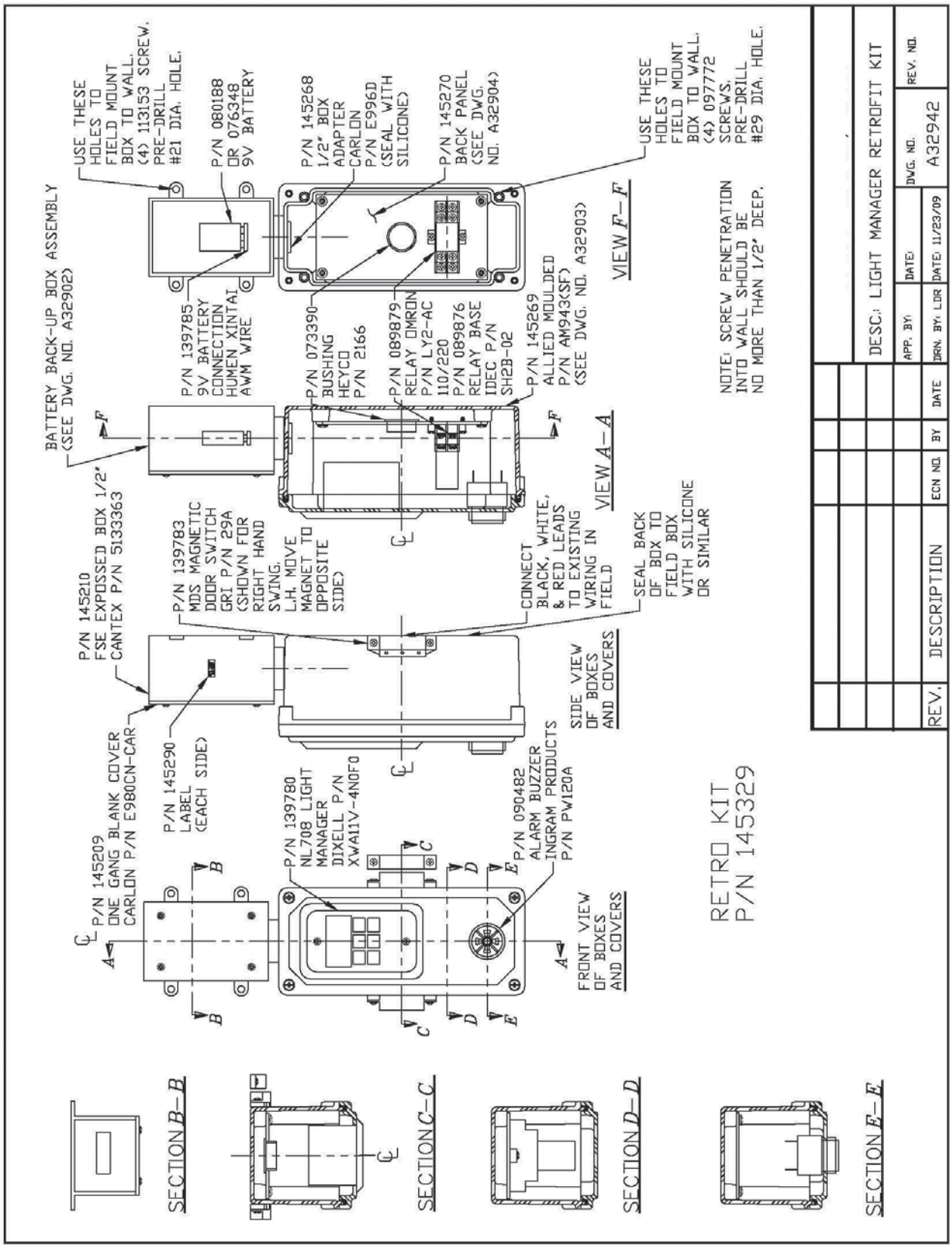
REV.	DESCRIPTION	ECN NO.	DRV/ENG	DATE
G	SHOW ALM CONT ON XWA11V AS NO		JMS RH	06/24/11
F	CORRECTED PANIC ALARM WIRING		JMS JMS	04/19/10
E	CORRECTED WIRING HORN/RELAY CKT.		JMS RH	10/14/09
D	ADD PANIC ALARM OPTION		JMS RH	09/25/09
C	CORRECTED RELAY WIRING		JMS RH	07/07/09
B	ADD PANIC ALM		JMS RH	06/23/09
B	ADD OCC SENS, PHONE DIALER, RLY		JMS RH	06/22/09
A	ORIGINAL ISSUE		JMS RH	04/20/09

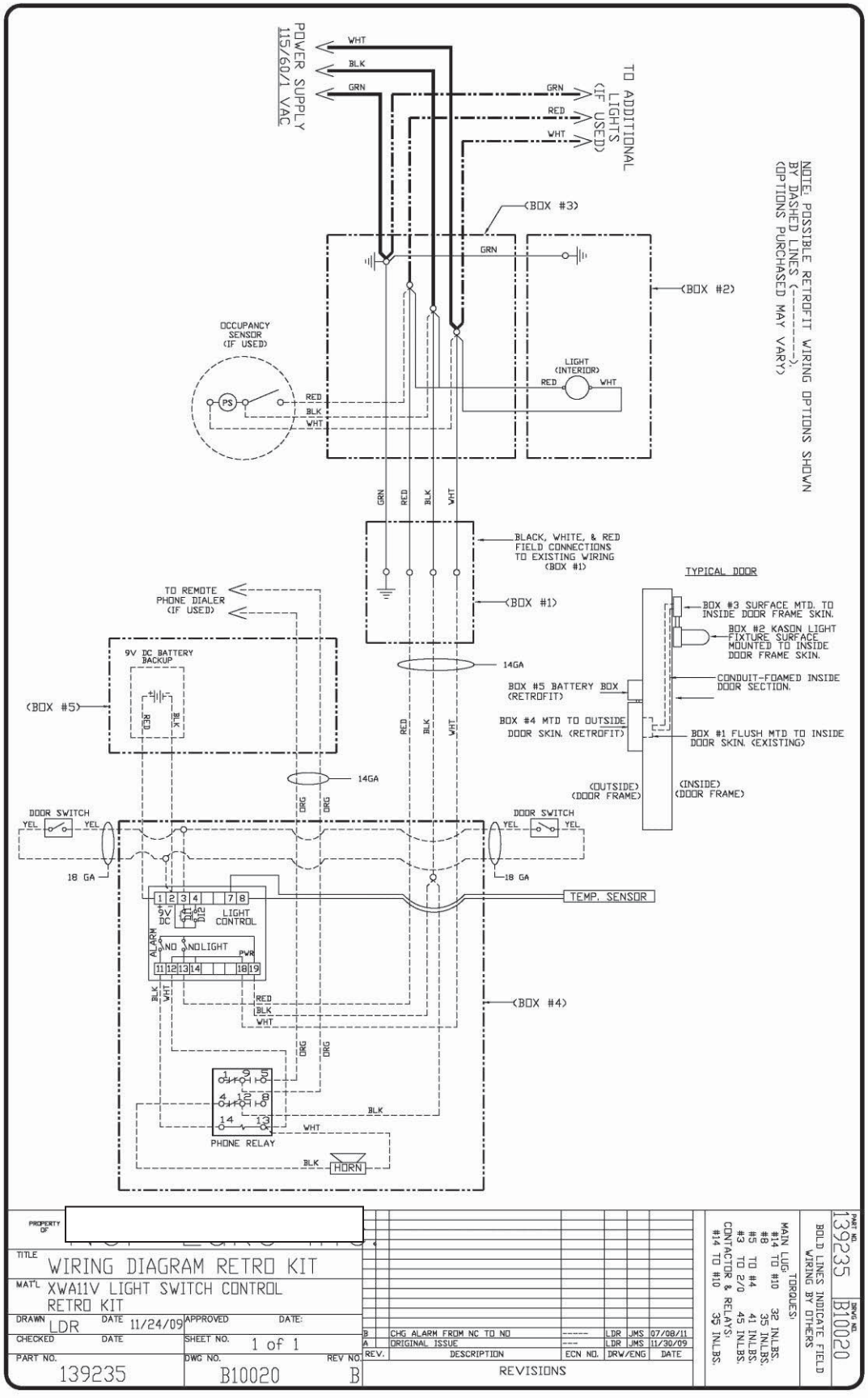
REVISIONS

MAIN LUGS TORQUES:
#14 TO #10 32 INLBS.
#8 TO #10 35 INLBS.
#5 TO #4 41 INLBS.
#3 TO 2/0 45 INLBS.
CONTACTOR & RELAYS:
#14 TO #10 35 INLBS.

BOLD LINES INDICATE FIELD WIRING BY OTHERS

PART NO. 139178 REV NO. B10007


RETRO KIT
P/N 145329
DESC: LIGHT MANAGER RETROFIT KIT
DWG. NO. A32942
REV. NO.
REV. DESCRIPTION ECN NO. BY DATE
APP. BY: DATE:
DRN. BY: LDR DATE: 11/23/09
P/N 145209 ONE GANG BLANK COVER CARLON P/N E980CN-CAR
P/N 145290 LABEL (EACH SIDE)
P/N 145210 FSE EXPOSED BOX 1/2" CANTEX P/N 5133363
P/N 139780 NL708 LIGHT MANAGER DIXELL P/N XWA11V-4N0F0
P/N 090482 ALARM BUZZER INGRAM PRODUCTS P/N PW120A
FRONT VIEW OF BOXES AND COVERS
SIDE VIEW OF BOXES AND COVERS
P/N 139783 MDS MAGNETIC DOOR SWITCH GRI P/N 29A (SHOWN FOR RIGHT HAND SWING, L.H. MOVE MAGNET TO OPPOSITE SIDE)
CONNECT BLACK, WHITE, & RED LEADS TO EXISTING WIRING IN FIELD
SEAL BACK OF BOX TO FIELD BOX WITH SILICONE OR SIMILAR
VIEW A-A
VIEW F-F
BATTERY BACK-UP BOX ASSEMBLY (SEE DWG. NO. A32902)
P/N 139785 9V BATTERY CONNECTION HUMEN XINTAI AWM WIRE
P/N 080188 OR 076348 9V BATTERY
USE THESE HOLES TO FIELD MOUNT BOX TO WALL. (4) 113153 SCREW. PRE-DRILL #21 DIA. HOLE.
P/N 073390 BUSHING HEYCO P/N 2166
P/N 089879 RELAY OMRON P/N LY2-AC 110/220 P/N 089876 RELAY BASE IDEC P/N SH2B-02
P/N 145268 1/2" BOX ADAPTER CARLON P/N E996D (SEAL WITH SILICONE)
P/N 145270 BACK PANEL (SEE DWG. NO. A32904)
P/N 145269 ALLIED MOULDED P/N AM943(SF) (SEE DWG. NO. A32903)
USE THESE HOLES TO FIELD MOUNT BOX TO WALL. (4) 097772 SCREWS. PRE-DRILL #29 DIA. HOLE.
NOTE: SCREW PENETRATION INTO WALL SHOULD BE NO MORE THAN 1/2" DEEP.
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

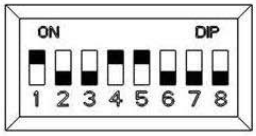

POWER SUPPLY 115/60/1 VAC
WHT
BLK
GRN
TO ADDITIONAL LIGHTS (IF USED)
GRN
RED
WHT
NOTE: POSSIBLE RETROFIT WIRING OPTIONS SHOWN BY DASHED LINES (<--------->). (OPTIONS PURCHASED MAY VARY)
(BOX #3)
GRN
(BOX #2)
OCCUPANCY SENSOR (IF USED)
PS
RED
BLK
WHT
LIGHT (INTERIOR)
RED
WHT
GRN
RED
BLK
WHT
BLACK, WHITE, & RED FIELD CONNECTIONS TO EXISTING WIRING (BOX #1)
(BOX #1)
TYPICAL DOOR
TO REMOTE PHONE DIALER (IF USED)
BOX #3 SURFACE MTD. TO INSIDE DOOR FRAME SKIN.
BOX #2 KASON LIGHT FIXTURE SURFACE MOUNTED TO INSIDE DOOR FRAME SKIN.
9V DC BATTERY BACKUP
14GA
CONDUIT-FOAMED INSIDE DOOR SECTION.
(BOX #5)
BOX #5 BATTERY BOX (RETROFIT)
BOX #4 MTD TO OUTSIDE DOOR SKIN. (RETROFIT)
BOX #1 FLUSH MTD TO INSIDE DOOR SKIN. (EXISTING)
RED
BLK
WHT
14GA
(OUTSIDE) (DOOR FRAME)
(INSIDE) (DOOR FRAME)
DOOR SWITCH
YEL
YEL
DRG
DRG
DOOR SWITCH
YEL
YEL
18 GA
18 GA
TEMP. SENSOR
1 2 3 4 7 8
9V DC
D11
D12
LIGHT CONTROL
ALARM
NO
NO
LIGHT
PWR
11 12 13 14 18 19
BLK
WHT
RED
BLK
WHT
(BOX #4)
DRG
DRG
1
9
10
4
12
8
14
13
BLK
WHT
PHONE RELAY
BLK
HORN
PROPERTY OF
TITLE
WIRING DIAGRAM RETRO KIT
MAT'L
XWA11V LIGHT SWITCH CONTROL RETRO KIT
DRAWN
LDR
DATE
11/24/09
APPROVED
DATE:
CHECKED
DATE
SHEET NO.
1 of 1
PART NO.
139235
DWG NO.
B10020
REV NO.
B
B CHG ALARM FROM NC TO NO ----- LDR JMS 07/08/11
A ORIGINAL ISSUE --- LDR JMS 11/30/09
REV. DESCRIPTION ECN NO. DRW/ENG DATE
REVISIONS
MAIN LUG TORQUES:
#14 TO #10 32 INLBS.
#8 35 INLBS.
#5 TO #4 41 INLBS.
#3 TO 2/0 45 INLBS.
CONTACTOR & RELAYS:
#14 TO #10 35 INLBS.
BOLD LINES INDICATE FIELD WIRING BY OTHERS
PART NO.
139235
DRWG NO.
B10020

Operating Instructions Alarm/Light Module XWA11V

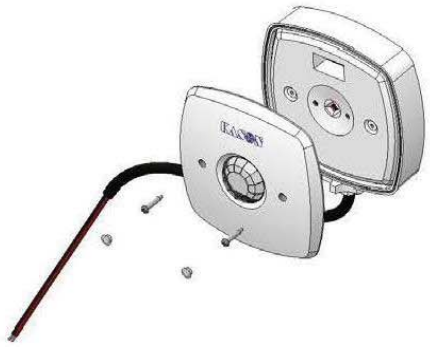
Installation:

1. The ideal location for the sensor is above door aimed to 8' in front of the doorway. To limit false tripping keep away from fans and vent ports. See "Sensor Set Up and Testing."
2. Thread the ½ NPT arm into a threaded 90° elbow, junction box or into light fixture housing. It is best to be able to adjust rotation and tilt of the sensor.
3. Connect the line voltage, neutral and load wires to the sensor leads as shown in wiring diagram (pg. 2).
4. Test the sensor for sensitivity and range (pg. 2). This unit is pre-set based on typical walk-in applications for a 1 minute delay and 80% sensitivity. If your application requires alternate settings, simply remove the front cover (2 screws & seals) and make the necessary changes. Remember to reinstall the two screw seals when finished.

Factory Settings



1 2 PIR Sensitivity	**3 4 5 Delay**	**6 7 8 Sensor**
↓ ↓ 100% high	↓ ↓ ↓ 10 seconds	↓ ↓ ↓ (factory)
↓ ↑ 90%	↓ ↓ ↑ 20 seconds	
↑ ↓ 80% (factory)	↓ ↑ ↓ 30 seconds	
↑ ↑ 70%	↓ ↑ ↑ 1 minute (factory)	
	↑ ↓ ↓ 2 minutes	
	↑ ↓ ↑ 5 minutes	
	↑ ↑ ↓ 10 minutes	
	↑ ↑ ↑ 20 minutes	



Sensor Assembly

Specifications:

Voltage: 120 / 277 VAC @ 60 Hz
Load: 120 VAC / 0- 800W ballast
277 VAC / 0-1200W ballast
Time Delay: 10 seconds – 20 minutes
Size: 4"H x 4"W x 2.16"D
[102.58cm*102.58cm*55cm]
Weight: 0.5 lbs [227 grams]
Temperature:
Min: -20 °F [-28.9 °C]
Max: 160 °F [60 °C]
Electrical Connection:
½" conduit connection
18" 18 AWG wire
IP 65
Wire temperature 105 deg C max *
cULus Wet location -Indoor Use Only
NSF
Protective Device:
A fast blow fuse or circuit breaker mounted within 25 feet from sensor (**Line** side) is required.

***Some incandescent fixtures may require higher temperature wires. Remote mounting or adding fiberglass sleeves over the wires may be required.**

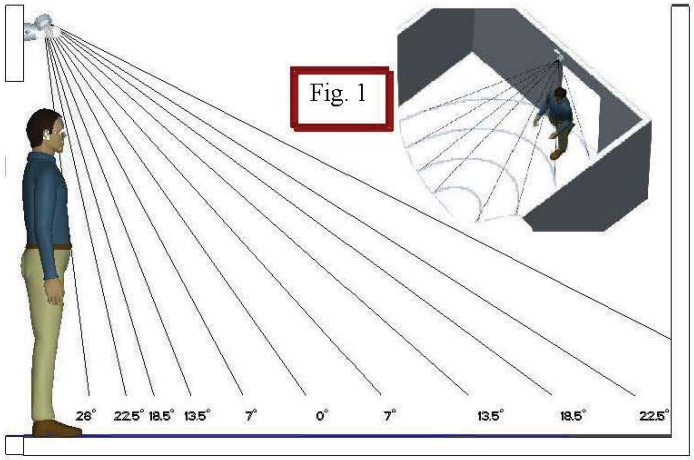
WARNINGS AND CAUTIONS:

- All installation must comply with local and National Electrical Codes.
- The manufacturer assumes no responsibility for improper installation or application.
- Turn off electricity at the breaker or fuse box before installation.

Special Note from the field:

Always disable any existing light switches. The motion sensor will not function as intended if the customer can turn the circuit off or has the ability to override the motion sensor.

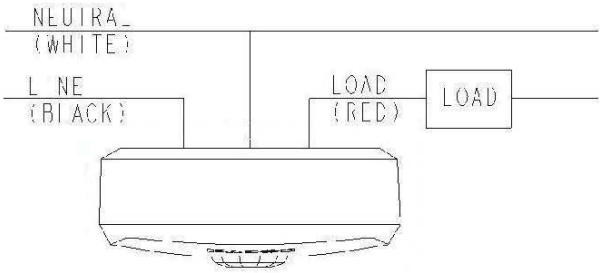
Sensor Set Up and Testing



Location:
Sensor should be placed above the door. Sensor should be angled toward the center of the room without any obstructions. Sensor lens is designed to work in zones. If occupant crosses a zone the sensor will turn the lights on. Zones are represented by the rings on the floor in (Fig. 1).

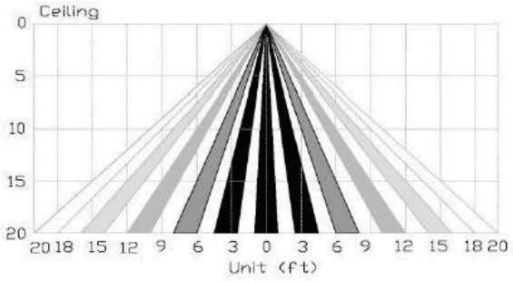
Testing:
Allow a few minutes for the sensor to warm up then ENTER room. The sensor is equipped with a "Red LED" indicator that will activate when motion is sensed. Make note where the sensor sees motion and turns on the light. Repeat movement after allowing lights to turn off.
Adjust sensor head for best room coverage. If the LED indicator is not visible then wait for the lights to go off.
Additional sensor may be required for large / long rooms.

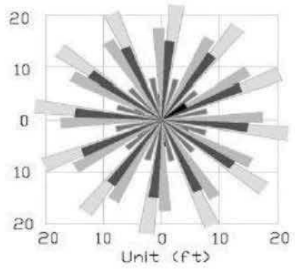
Wiring for Single



Replacement Parts List:

11901A00005	Low Bay sensor module (up to 20')
11901000009	Wall mounting kit with cord grip

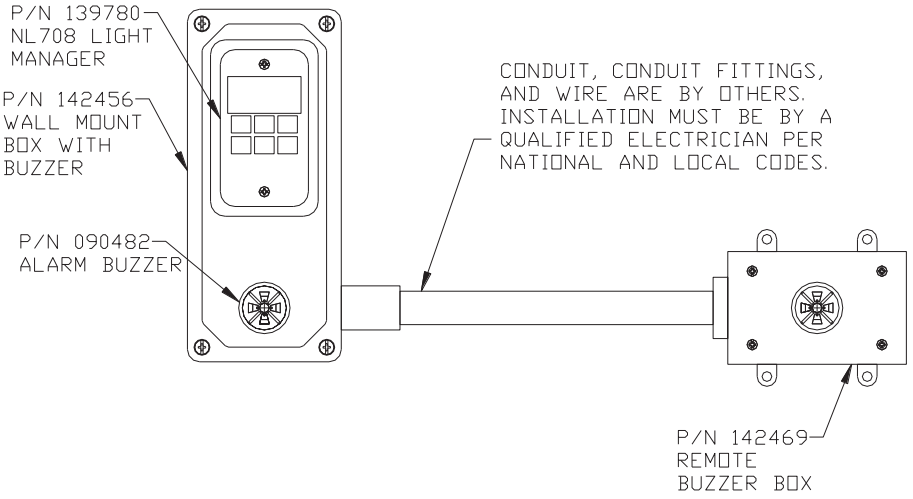


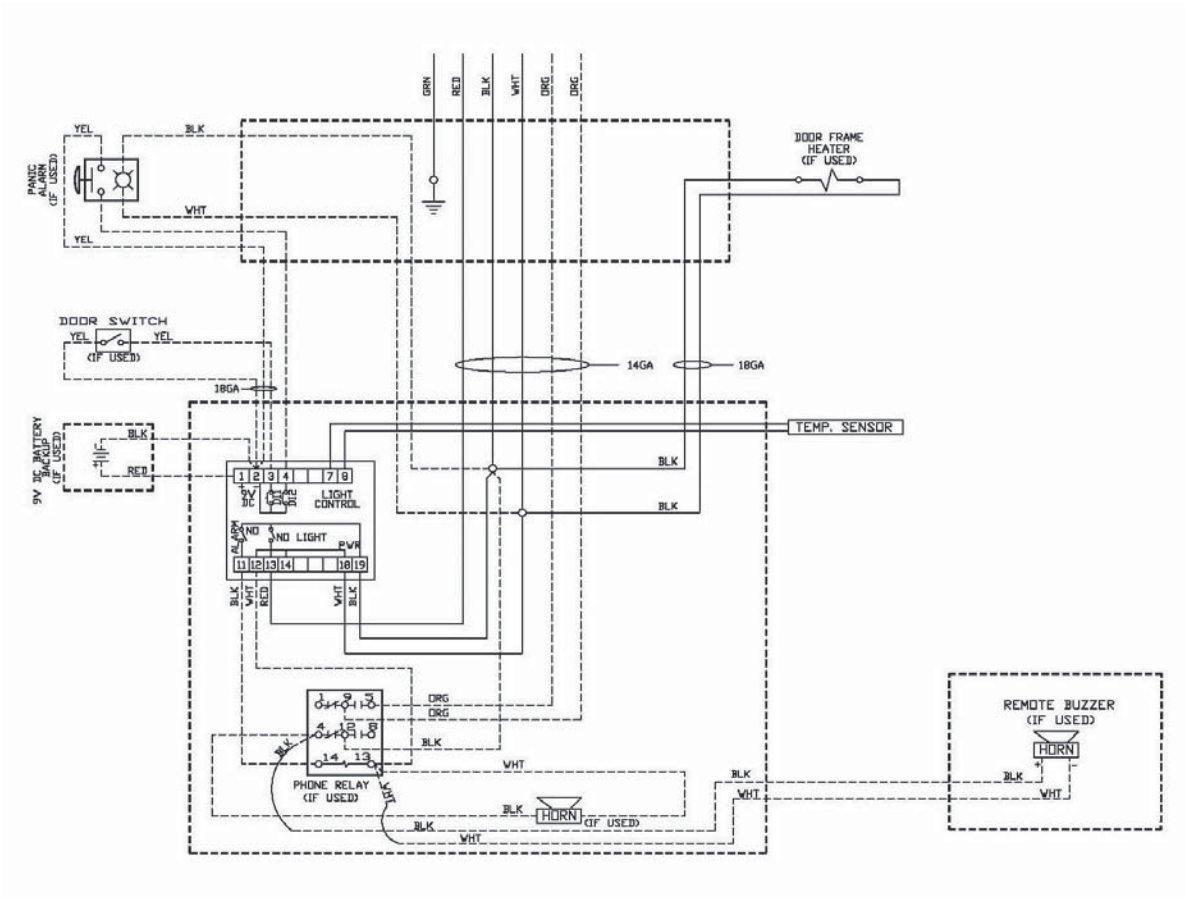


Remote Buzzer Box Installation

Installation:

1. Mount the remote buzzer box in the location desired.
2. Drill the appropriate size hole for the conduit fitting into the Wall Mount Box P/N 142456.
3. Conduit, conduit fittings, and wire are by others.
   Installation must be by a qualified electrician per the applicable national and local codes.
4. Connect a black wire to terminal #4 and a white wire to terminal #13 of the Phone Relay in the Wall
5. Mount Box.





NOTES

NOTES

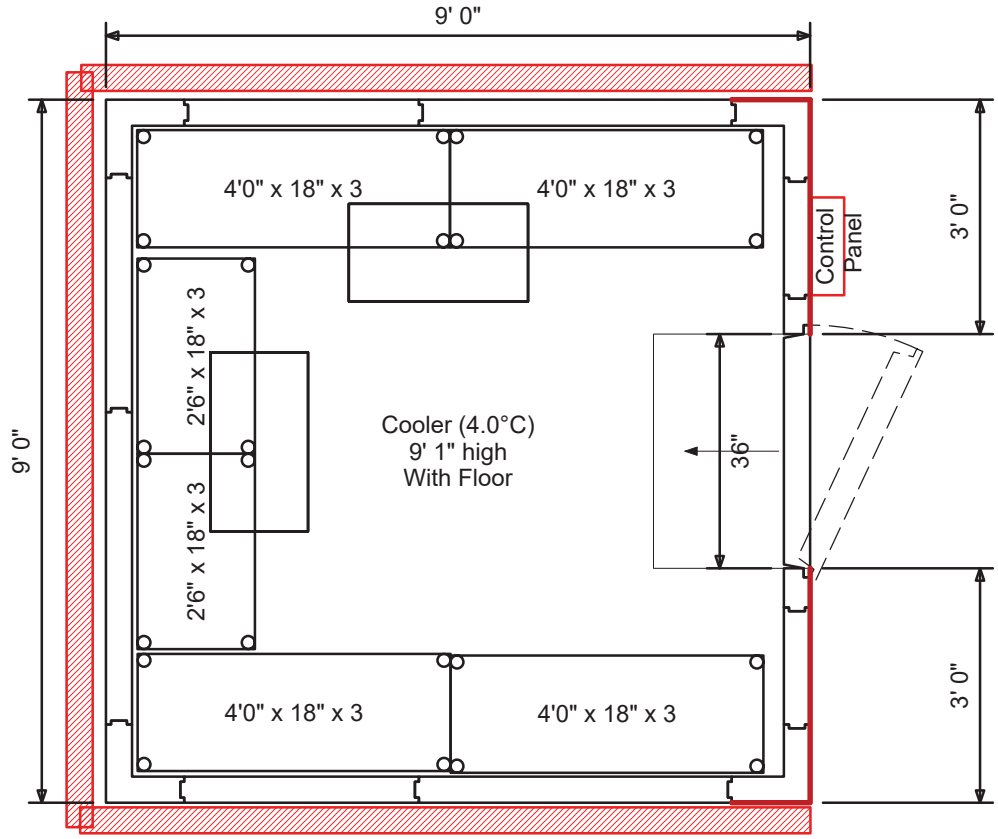
SCIENTIFIC
Second and Elm Streets
P.O. Box 248
Hudson, Wisconsin 54016
800-477-5253
715-386-2323
715-386-6149 FAX

Prepared by: _____

Nor-Lake is registered by UL to ISO 9001-2008. California State Contractor License #940932.THIS BID, IF ACCEPTED, IS SUBJECT TO EXECUTION OF A WRITTEN CONTRACT OR PURCHASE ORDER.

(1) Nor-Lake ENVIROLINE 4.0 Walk-In Cooler
9' 0" long, 9' 0" wide, 9' 1" high.

Finishes:
20 Gauge Stainless Steel - Interior wall, Interior ceiling
26 Gauge Corrosion Resistant Stucco Embossed Coated Steel - Exterior wall
26 Gauge Embossed White Steel - Exposed wall, Exterior door frame, Exterior door
26 Gauge Smooth Galvanized - Ceiling topside, Floor bottom side
16 Gauge Stainless Steel - Interior floor



SCIENTIFIC
Second and Elm Streets
P.O. Box 248
Hudson, Wisconsin 54016
800-477-5253
715-386-2323
715-386-6149 FAX

(69) Sq. Ft. Of 1/8" Vinyl Floor Matting Black
(1) Seismic Calculations and Tie Downs (CA) Includes calculations being provided for the customer to present to the appropriate approval office. If additional resubmittals are required a separate Purchase Order must be received prior to beginning the seismic calculation resubmittal process. Any additional resubmittal will not be worked on until review of the original funds is evaluated and additional costs submitted, and an additional Purchase Order is received. NOTE: The walk-in will not be released to Production until the seismic approval has been approved by the appropriate California approval office. If seismic tie downs are required the concrete pad must extend 6" beyond the face of the walk-in.
(1) 36" X 78" Walk-In Door left-hand swing
Includes door closer, cam lift hinges (one spring loaded), NL9800 deadbolt key/padlock handle with inside release, magnetic gasket, heater wire, (thermostatically controlled by control panel), double sweep gasket & switch with pilot light.
(1) 36" High, Interior 1/8" Aluminum Diamond Tread, Door And Frame Mounted Kickplates (Includes Extra Hinge).
(1) 14" x 24" 3-Pane Unheated Viewport With Frame Heater (Indoor Only)
(1) Door Through Panel Electrical; All Conduit Concealed Inside The Door Frame, Hole Pre-Drilled Through Ceiling And Field Installed Ceiling Mounted Junction Box With Conduit Provided.
(1) Hydraulic Door Closer K1094 (082656), In Lieu Of Standard K1095
(1) 36" Interior Ramp With Non-Skid Strips Applied To Top (24" Deep)
Sq. Ft. Of 3/4" CDX Plywood Subfloor for Cooler (4.0°C)
(1) 48" Fluorescent, Vapor-Proof, Freezer Light Fixture With T5 Bulbs And Low Temperature Electronic Ballast (Shipped Loose)
(3) Junction Box Installed In Wall for Card Reader by Others With Power Stubbed To Ceiling Topside.
(1) Inside Panic Alarm System With "Personnel Emergency" Sign, Actuator, And Sounder.
(4) Stainless Steel Shelving (Amco II) 4' 0" x 6' 0" x 1' 6" x 3 tiers.
(2) Stainless Steel Shelving (Amco II) 2' 6" x 6' 0" x 1' 6" x 3 tiers.
(2) 6" x 12" Plastic Backing Plate at the top of the Door and Frame for Card Reader by Others

(1) Model CP6L Series Control Panel, U.L. Approved. CP6L Microprocessor Based Programmable Temperature Controller, Liquid Crystal Alphanumeric Display with 4x20 Character, Simultaneous Product and Air Temperature Display, System Mode Indicator, High/Low Audio and Visual Alarm with Dry Contacts. Power Failure Alarm, Service Prompts, Password Entry System and Expandable for Communication Ports and Light Control. Key Locked Door with Viewing Cover, Circuit Breakers and 10" Temperature Chart Recorder.
(1) CPB Series Back Up Outputs For Multi Compressor Control.
Back up output provides automatic compressor rotation based on user selected time period, or both systems run simultaneous based on demand, or user selected temperature setting.

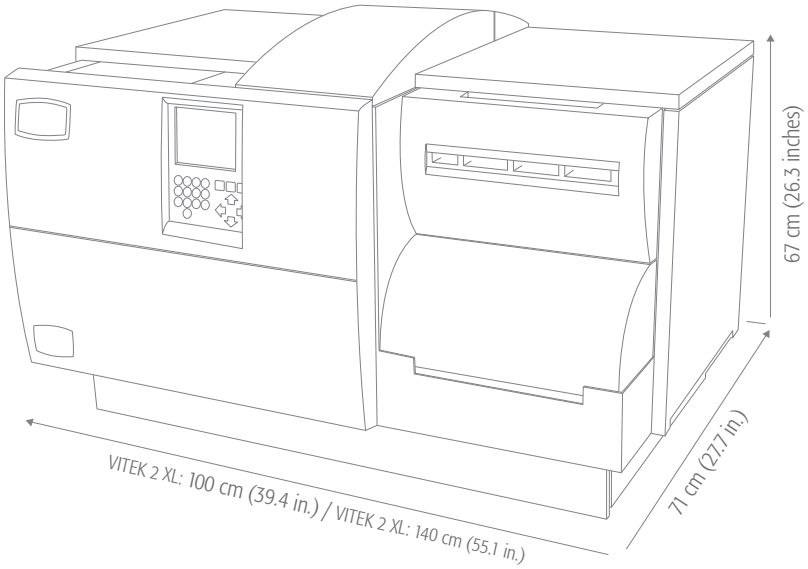
(2) Special NWWD50RL4 (4 deg. C) Operation, High Temperature, Water Cooled, R-404A, Refrigerant, Remote Refrigeration System, Welded Hermetic , Low Profile Unit Cooler, Meets CEC Requirements, Condensing Unit Rack Overall Size Is 26.75 Inches Wide, 35 Inches Long And 13.5 Inches High. Unit Cooler Overall Size Is 15 Inches Wide, 27.5 Inches Long And 15.25 Inches High. Condensing Unit, 208/230-1-60 Electrical Requirements Are 6.1 Minimum Circuit AMPS And 15 Maximum Fuse Size. (system capacity 4747 BTU's/hour at 37.8°C ambient temperature.)
.(1) Piping Diagram
Calculated load for Cooler (4.0°C) is 2871 BTU's/hour calculated from 24 deg. C ambient temperature, 21.1 deg. C floor temperature (insulated floor), 23 minutes open door time per 24 hrs for(1) 36.00" X 78.00" walk-in door opening into 24 deg. C ambient (normal use), (1) 48" Fluorescent, Vapor-Proof, Freezer Light Fixture With T5 Bulbs And Low Temperature Electronic Ballast (Shipped Loose) 108 Watts operating 12 hours per day, no occupants working in the room, no vent air, and no additional electrical load.. All calculations are based on data supplied by ASHRAE publications
Refrigeration is “sized” for holding product only; that is; our calculation is based on product entering at the same temperature as the desired temperature of this walk-in. If you feel that this is insufficient, please advise.

Construction Approvals: NSF Approved, cULus and CSA Electrical, UL Flame Spread-25 and ULC Flame Spread-50 in accordance with ASTME-84.

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL
PATHOLOGY
MICROBIOLOGY - MI014

Designed for Efficiency

- Choose a module designed for 60 or 120 cards.
- A system is comprised of a PC, Reader/Incubator, and Smart Carrier Station™
- Capable of performing Gram-Negative, Gram-Positive and Yeast Identification and Susceptibility Tests.
- Increase work capacity by connecting 2 Reader/Incubator Modules together.



Weight:
VITEK 2: (60 card capacity) 110 kg (240 lb)
VITEK 2 XL: (120 card capacity) 145 kg (320 lb)

Electrical Power Requirements:
- 100/120 VAC (50-60 HZ)
- 220/240 VAC (50-60 HZ)

Heat Dissipated:
VITEK 2: 512 BTU/Hr. (nominal)
VITEK 2 XL: 682 BTU/Hr. (nominal)

Environmental Requirements:
- Operating Ambient Temperature Range: 68°F-86°F (20°C to 30°C)
- Operating Humidity Range: 20% to 80% relative humidity, non-condensing

Altitude:
up to 2000 m.

Capacity:
60 or 120 cards
(2 modules can be connected to the same computer).

bioMérieux S.A.
69280 Marcy l'Etoile
France
Tel. : **33** (0)4 78 87 20 00
Fax : **33** (0)4 78 87 20 90

www.biomerieux.com

BIOMÉRIEUX

The Fully Automated Solution

BIOMÉRIEUX

Putting the **Patient First**

Antimicrobial resistance is threatening to significantly reduce the available arsenal of antimicrobials. As a microbiologist, you play a crucial role in providing information that leads to improved **therapeutic success** and **patient outcome** [1] – an increasingly difficult task given the rise in antimicrobial resistance. Helping the clinician select the **best treatment fast** based on the **right identification and resistance information** is crucial.

With **VITEK® 2**, you can accomplish all this **in less time** and still focus on those tough tasks requiring a microbiologist's highly specialised skills. This **completely automated** system provides same-day identification and antibiotic susceptibility results.

Complete

Smart Carrier

Same day results

VITEK 2 Card - A unique concept in ID/AST

- Designed to provide ID/AST results in as little as **5 to 8 hours**. [2]
- Reduced hands-on time, **no additional reagents** are required
- Optimised user **safety** as it is a closed disposable
- **Maximum traceability** provided with the pre-applied card barcodes
- Lightweight **reduces disposable costs**

The Smart Carrier Station™ (SCS) teamed with the card saves further valuable time by handling the organism suspensions and linking the specimen to the test card.

Streamline Your **Workflow**

This system will positively revolutionize your way of working. VITEK 2 really means complete automation.

Minimum preparation

After primary isolation, handling is minimized in a simple inoculum preparation and standardization. The standardized inoculum is placed into the cassette and a specimen identification number is entered into the Smart Carrier Station.

Optimum Traceability

Using an easy-to-use hand-held scanner the VITEK 2 card type is then read from the card's pre-applied barcode and linked to the specimen ID.

Complete Automation

After loading the cassettes, incubation and reading are controlled by the system.

No user intervention is required.

(1) Barenfanger et al, JCM, May 1999, Vol 37, No 5
(2) Rommler, et al, Poster C-123, ASM Orlando, May 2006

VITEK 2™

ID/AST Automation

Station™

A unique concept in test preparation that saves time, offers full traceability and enhances productivity

Results at a Glance !

We have designed the VITEK® 2 software to help you get your results out fast.

- **Intuitive**, **easy-to-use**, familiar Windows-design layout
- **Easy access** to ID and AST results using the navigation tree and filters
- **Rapid result searches** by patient, bench, date tested, organism, technologist, accession number
- Simple bidirectional connection with your **LIS**
- **Automatic validation and transfer** of preliminary results

Antibiotic Choice Made Easy

To facilitate choosing the most appropriate antibiotic, bioMérieux has developed the **Advanced Expert System**™ (AES) to provide rapid, accurate "fingerprint" **recognition of bacterial resistance mechanisms**.

Green indicator: fully consistent results

Yellow indicator: inconsistent result, review requested

Red indicator: unknown phenotype, check results

Purple indicator: phenotype not in database

AES even recommends therapeutic changes when resistant phenotypes are recognised to help ensure therapeutic success.

BIOMÉRIEUX

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL
PATHOLOGY
MICROBIOLOGY - MI017

Model 3960 Series

29 cu ft Environmental Chamber

Operating and Maintenance Manual 7003960 Rev. 15

Visit us online to register your warranty
www.thermoscientific.com/warranty

Thermo SCIENTIFIC

Section 7 Specifications

** Specifications are based on nominal voltages of 115V or 230V in ambient temperatures of 22°C to 35°C.*

Temperature

Control . . . . . .+0.1°C Microprocessor PID
Setpoint . . . . . .Digital - Touch Pad, 0.1°C
Range . . . . . .+5°C above ambient to 60°C
Uniformity . . . . . .+0.3°C @ +37°C
Tracking Alarm . . User programmable (low) indicator
Overtemp . . Tracking, user programmable, action and indicator
Display . . . . . .Digital, LED, 0.1°C increments

Temperature Safety

Type . . Extreme temperature safety, action and indicator
Sensor . . Thermostat, independent of temperature control system
Indicator . . Message center, audible and visual alarms

Shelves

Dimensions . . . 30.62" W x 25.81" F-B (77.78 cm x 65.56 cm)
Construction . . . . . .Solid stainless steel, 2B finish
Surface Area . . . . . .5.4 sq. ft (0.51 sq. m) per shelf
Max per Chamber . . . . . .145.8 sq. ft (13.55 sq. m)
Standard 5
Maximum 27
Clearance . . . . . .Adjustable on 2" (5 cm) centers

Construction

Interior volume: . . . . . .29 cu ft (823 liters)
Interior: . . . . . .304 stainless steel, 2B finish
Exterior: . . . . . .18-gauge cold rolled steel
Exterior Door: . .Heated, triple pane tempered glass
Outer Door Gasket: . . . . . .Molded vinyl
Insulation: . . . . . .2" fiberglass

Fittings

Access Port: . . .2.4” (6.1 cm) ID, one port per side

Electrical

Model 3960

100-120VAC, 50/60Hz, 1 PH, 9.0 FLA

Operating Range, including fluctuations: 90-125V, 50-60Hz

15A Breaker power switch

Model 3961

200-230VAC, 50/60Hz, 1 PH, 5.0 FLA

Operating Range, including fluctuations . . 180-250V, 50-60Hz

8A Breaker power switch

Power Switch: . . . . . .2-pole circuit breaker

Accessory Outlet . . Voltage equal to the cabinet input, 75W max., 0.5mA leakage current

Interior Outlet . . Voltage equal to cabinet input, 230W max, 0.5mA leakage current

Remote Alarm Contacts . . Deviation of temperature & power, N/O & N/C

Unit BTU Output

115V/230V: . . . . . .510 BTUH (150W)

Dimensions

Exterior: . . . . . .38.0” W x 80.0” H x 33.0” F-B
. . . . . .(96.5 cm x 203.2 cm x 83.8 cm)

Interior: . . . . . .31.0” W x 60.0” H x 27.0” F-B
. . . . . .(78.7 cm x 152.4 cm x 68.6 cm)

Weight: . . . . . .500 lbs. (226.8 kg)

Certification . . . . . .3960 Series - UL, CSA, CE
. . . . . .3961 Series – CSA, CE

Thermo Scientific Large Capacity Reach-In CO_2 Incubators

Maximum volume for high-throughput requirements

The Thermo Scientific Large Capacity Reach-In CO_2 incubator provides the extra space required for large experiments and long-term, valuable sample storage.

- **Convenient larger 29 cu. ft. capacity easily accommodates shakers, bioreactors and other related equipment within its tightly controlled environment**
- **High quality stainless steel interior**
- **Heated glass door prevents unwanted condensation**
- **Casters for easy mobility**

PROJECT NO.
664-14-427
RENOVATE
ANATOMICAL
PATHOLOGY
MICROBIOLOGY -
MI018

Heavy-duty, solid stainless steel shelves are easy-to-clean, corrosion resistant

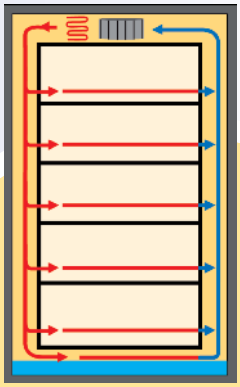
Standard remote alarm contacts and available data outputs allow connection to an in-house monitor/alarm

Interior and exterior accessory receptacles provide a convenient power source

Two thru-wall access ports (one on right and left sidewalls) for easy addition of probes, sensors, or power cords

Leveling feet provide stability for added safety in the lab.

Swivel, locking casters ensure easy mobility for installation and cleaning



OUR DIRECTED AIRFLOW

minimizes the risk of product desiccation and loss, and wasted time and money due to poor temperature uniformity and recovery

Intuitive message center

Easily monitor operating parameters via the bright alphanumeric display, including humidity level indicators, process and alarm status messages.

Easy to Use RH system

Three customizable settings for humidity (off, medium and high) are reliable and simple to use. Three water fill options (automatic, semi-automatic, and ergonomic manual) accommodate your facility's setup and minimize frequent refills.

THERMO SCIENTIFIC LARGE CAPACITY REACH IN CO_2 INCUBATOR

Thermo Scientific Model No.	Description	Interior	Sensor	Volume	Voltage
3950	**Large Capacity Reach In CO_2 incubator**	stainless steel	TC	29 cu. ft. (821 L)	115V, 50/60Hz

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL
PATHOLOGY
MICROBIOLOGY - MI018

Thermo Scientific Forma® Reach-In CO_2 Incubator

Designed for growing needs

Uniform Performance

High Capacity Reach-In that Grows with Your Needs

Our full-featured Thermo Scientific Forma Reach-In CO_2 Incubator is the reliable reach-in that will meet your application needs today and in the future – without requiring expensive add-on options. This durable unit is ideal for culturing large volumes of patient samples for bacterial growth, performing short-term growth studies, and working with large volume products. The reach-in provides elevated RH to prevent product desiccation in medium-term cultures, and maintains temperature uniformity even when equipment is installed in the chamber (e.g., cell rollers, rockers, shakers, spinners, or stirrers).

Tight temperature uniformity contributes to an ideal culturing environment, even when the chamber is completely full.

Valuable features are included, rather than optional, ensuring cost-effectiveness and ultimate flexibility for a wide range of applications.

This carefully designed reach-in is easy to configure and use. It includes powerful, intuitive Enviro-Scan® controls that are common to other Thermo Scientific Forma products, a selectable humidity range, and accessories for specialized needs, including shelf systems to support two shakers or extra-heavy product loads.

The Thermo Scientific Forma Reach-In CO_2 Incubator – it's built to last; it's designed to accommodate your growing needs.

HIGH CAPACITY MODEL 3950 (3951)

- **Roomy 29.0 cu. ft. interior volume**
- **Five adjustable shelves included**
- **Swivel, locking casters for mobility**
- **All stainless steel interior for durability**
- **Access ports and interior outlet for convenience**

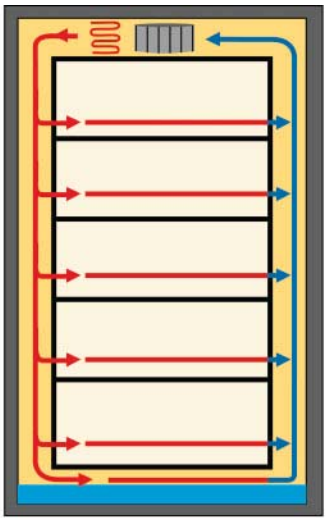
Tight Temperature Uniformity for Ideal Culturing

Temperature uniformity contributes to an ideal culturing environment. You can be confident of optimum temperature uniformity and recovery when you put this high capacity chamber to the test with large product loads and low output, heat-generating equipment.

Advantages of a Directed Horizontal Laminar Airflow System

Our reach-in incubator's directed airflow system promotes an ideal growth environment. The proven design includes a positive pressure feed plenum on the left side of the chamber and a negative pressure return plenum on the right. This combination directs air across the surface of each solid shelf.

Even when filled with samples or equipment, each shelf receives a consistent flow of conditioned air for optimum temperature uniformity and recovery. By design, the feed plenum cannot be blocked by the chamber's contents.



Our directed airflow design

As opposed to our horizontal airflow system, top-to-bottom (non-directed) airflow systems use a top-mounted fan to push air down through wire shelves. Temperature uniformity and recovery can deteriorate quickly when shelves are filled because air movement is blocked. That temperature variation, alone or when combined with frequent door openings, may compromise growth conditions or make process validation difficult.

The Thermo Scientific Forma Reach-In CO_2 Incubator's directed airflow minimizes the risk of product desiccation and loss, and wasted time and money due to poor temperature uniformity and recovery.

Valuable Features Included for Cost-Effectiveness and Flexibility – Right from the Start!

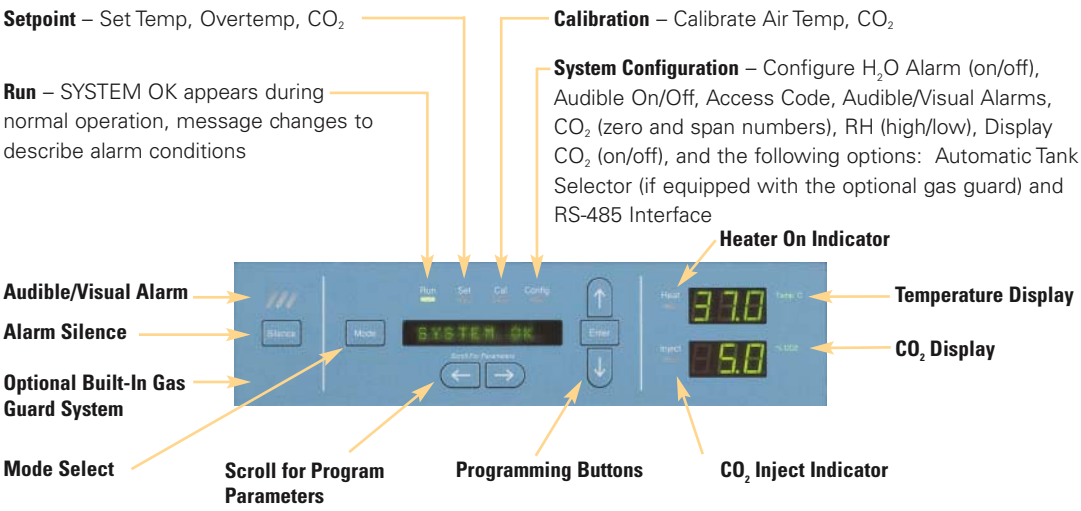
Our rugged 29.0 cu. ft. (821.2 liters) Thermo Scientific Forma Reach-In CO_2 Incubator is loaded with valuable features that will serve you from day one. You don't need to purchase a range of expensive options to create a chamber that truly meets your needs. Primary features for ultimate flexibility are already built-in.

- Swivel, locking casters ensure easy mobility for installation and cleaning. Leveling feet provide stability for added safety in the lab.
- Heated triple-pane glass door minimizes condensation and permits a clear view of your product.
- Standard remote alarm contacts and available data outputs allow connection to an in-house monitor/alarm system to track chamber conditions, helping you meet internal and regulatory documentation requirements.
- Two thru-wall access ports (one on right and left sidewalls) make it possible to add probes, sensors, power cords, etc. without altering the cabinet.
- Interior and exterior accessory receptacles provide a convenient power source.
  - Interior GFCI duplex receptacle on the 115V Model 3950 (single European 230V CEE 7 on Model 3951), located in the upper right corner of the rear wall, permits the use of shakers, cell rollers, and other equipment inside the chamber, eliminating the inconvenience of an extra external power strip.
  - Exterior receptacle, located on the upper right side of the control panel, is available for connecting an optional recorder or other equipment.
- Heavy-duty, solid stainless steel shelves are easy to clean, saving time and effort; more corrosion resistant than coated wire shelves for long life; and adjustable on 2.0" (5.1cm) centers for convenience.
- Additional reinforced shelving systems are available for increasing shelf load and maximizing stability when used with heavy product load or equipment, such as our Thermo Scientific Forma Orbital Shakers.
- Stainless steel interior is more durable and corrosion resistant than plastic or painted metal, ensuring a long life and minimizing equipment costs.

Easy to Configure and Use

Quality construction. Reliable performance. Intuitive controls. Our reach-in CO_2 incubator is designed for ease of use and long life.

- Three-setting RH system – off, medium, high – is easy to use, reliable, and can be customized for your application.
- Three water fill options – automatic, semi-automatic, and ergonomic manual – accommodate your facility's setup and provide the convenience of a long time period between refills.
- Enviro-Scan Microprocessor Message Center (shown below) allows you to control all parameters without complicated programming.



Cell Roll System

The optional cell roll system allows extensive production of monolayer cell cultures in standard roller culture vessels. Oxygenation and exposure of the cells to the media growth area are improved. Culture yields are increased by the uniform temperature control and cell roll system's continuous, gentle rotation.

The reach-in accommodates a cell roller up to 7 decks high with 5 positions per deck for a maximum total of 35 positions, or bottles.

Achieving maximum capacity requires a Model 4862 (4868) three tier cell roller base (15 positions), four add-on tiers (20 positions), and a reinforced floor/ramp.

All position drive is standard. Adjustable speed control provides precise speeds of 0.125 to 6.25 RPM with ±1.0% accuracy, based on 110mm bottles.

Stock No.	Description
4862	Three Tier Cell Roller Base (15 positions), 120V, 50/60 Hz, 29.8"W x 27.8"H x 24.4"F-B (75.7cm x 70.6cm x 62.0cm)
4868	Same as Model 4862 but 230V, 50/60 Hz
190049	Add-On Tier (5 positions), 29.8"W x 7.1"H x 24.4"F-B (75.7cm x 18.0cm x 62.0cm), customer installed
190777	Reinforced Floor with Removable Ramp, ramp extends 23.0" (58.4cm), factory installed
500182	Same as No. 190777 but customer installed
228077	Rotation Alarm System, includes annunciator jack, factory installed
228078	Battery Back-Up, provides 24 hours of power if a power failure occurs, factory installed
475560	110mm x 285mm Glass Bottles (4 per case)

(Additional accessories are listed on page 6.)

Specifications

Temperature
Control . . . . . ±0.1°C
Range . . . . . 5°C above ambient to 60°C (140F)
Uniformity . . . . . ±0.3°C @ 37°C (98.6F)
Tracking Alarm . . . . . User-programmable low

Overtemperature
Sensor . . . . . Precision thermistor
Setability . . . . . 0.1°C
Function . . . . . User-programmable, action (shuts off heat), and indicator
Controller . . . . . Independent analog electronic

Temperature Safety
Sensor . . . . . Independent thermostat
Controller . . . . . Independent analog electronic

CO_2
Control . . . . . Better than ±0.1%
Range 0-20%
Inlet Pressure . . . . . 15 PSIG (1.0 bar)
Sensor . . . . . T/C (thermal conductivity)
Readability & Setability . 0.1%
Tracking Alarm . . . . . User-programmable high/low

Humidity
Input Water Quality . . . . 50K to 1Meg Ohm resistance
Selectable Ranges. . . . . Off, Medium >80%, High >90%
Humidity Reservoir . . . . 4 gallons (15.1 liters)
Water Level Alarm. . . . . User-programmable on/off

Fittings
Access Port . . . . . 2.4" (6.1cm) I.D., one on each side, with stopper
CO_2 Inlet . . . . . 1/4" hose (barbed)
Water Inlet. . . . . 1/4" MPT
Condensate Drain . . . . . 3/8" FPT
Overflow Drain . . . . . 3/8" MPT

Unit Heat Load
115V/230V . . . . . 510 BTUH (150 Watts), 129 kcal per hour

Shelves
Dimensions . . . . . 30.6" x 25.8" (77.7cm x 65.5cm)
Construction . . . . . Type 304, 2B finish, solid stainless steel
Surface Area . . . . . 5.4 sq. ft. (0.5 sq. m)
Max. per Chamber . . . . 145.8 sq. ft. (13.5 sq. m)
Standard, Maximum . . . 5, 27

Construction
Interior Volume . . . . . 29.0 cu. ft. (821.2 liters)
Interior . . . . . Type 304, 2B finish, stainless steel
Exterior . . . . . Cold-rolled steel, powder coated
Insulation . . . . . 2.0" (5.1cm) fiberglass
Exterior Door . . . . . Heated, triple pane, tempered glass
Outer Door Gasket . . . . Molded vinyl

Electrical
3950 . . . . . 115V, 50/60 Hz, 10.0 FLA (Operating range 90-125V includes voltage fluctuations)
3951 . . . . . 230V, 50/60 Hz, 6.0 FLA (Operating range 180-250V includes voltage fluctuations)
Circuit Breaker/ Power Switch . . . . . 3950: 15 Amps/2 Pole 3951: 8 Amps/2 Pole
Exterior Convenience Receptacle . . 75 Watts maximum (matches cabinet voltage)
Interior Convenience Receptacle . . . 230 Watts maximum (matches cabinet voltage)
Plug . . . . . 115V: NEMA 5-15P Plug 230V: CEE 7/7 Plug
Alarm Contacts . . . . . Power interruption, deviation of temp and CO_2, customer connections through jack on back of unit
Data Outputs (opt.) . . . . RS-485, 0-1V, 0-5V, 4-20 milliamp (select one)

Dimensions
Exterior . . . . . 38.0"W x 80.0"H x 33.0"F-B (96.5cm x 203.2cm x 83.8cm)
Interior . . . . . 31.0"W x 60.0"H x 27.0"F-B (78.7cm x 152.4cm x 68.6cm)

Weight
Net . . . . . 500 lbs. (226.8 kg)
Shipping (Motor) . . . . . 660 lbs. (299.4 kg)

Specifications are based on nominal voltages of 115V or 230V in ambients of 22°C to 25°C (71.6F to 77F). Both units are UL Listed to United States and Canadian requirements and bear the CE Mark.

Accessories and Warranty

Accessories are customer installed unless indicated otherwise. (Refer to page 4 for a description of the cell roll system.)

Carboy Kit

Carboy Kit (No. 191596) makes it easy to semi-automatically fill the reach-in. The carboy, which can be mounted on either side of the reach-in, can be carried to the water source or filled while mounted.

Kit includes an autoclavable 2 gallon (7.8 liters) carboy, valve, adapter, hose, and mounting bracket.

Shelves and Reinforced Shelf Systems

Stock No.	Description
224139	Solid Stainless Steel Shelf with Channels
224155	Perforated Stainless Steel Shelf with Channels
	Solid Stainless Steel Reinforced Shelf Systems –
224161	Adjustable Reinforced Shelf with Channels, increases shelf load to 150 lbs. (68.0 kg) maximum with shelf fully inserted and stationary (maximum 2 per unit, not for shakers), adjustable on 2.0" (5.1cm) centers, can be removed for cleaning
1900005	Two Fixed Reinforced Shelves, provide extra support for lab equipment (e.g., 2 Forma Orbital Shakers, 250 RPM maximum each), factory installed 1.0" and 30.0" (2.5cm and 76.2cm) above the floor, rubber isolators instead of casters are installed on the reach-in for added stability

Data Outputs (select one), factory installed

Stock No.	Description
190523	RS-485 interface
190512	4-20 milliamp
190543	0-5V analog
190544	0-1V analog

Additional Accessories

Stock No.	Description
190239	Lexan® Inner Door Kit, factory installed
190514	Door Lock, factory installed
190591	Door Glass Cover, factory installed
	6", 7 Day Circular Chart Recorders –
201155	Single Pen, 115V
201156	Single Pen, 220V
201159	Dual Pen, 115V, 1 probe, temp/RH
201160	Dual Pen, 220V, 1 probe, temp/RH
190164	Additional Thru-Wall Access Port, 2.4" (6.1cm) I.D., factory installed
1900000	Built-In CO_2 Gas Guard, factory installed
6003950	IQ/OQ, MS Windows®-compatible document disk for process customization and detailed checklists to qualify unit setup and operation

Warranty

We confidently back our Forma Reach-In CO_2 Incubator with a full one year parts and labor warranty.

Thermo SCIENTIFIC

North America: USA/Canada +1 866 984 3766 www.thermo.com/incubators
Europe: Austria +43 1 801 40 0, Belgium +32 2 482 30 30, Finland +358 9 329 100, France +33 2 2803 2000, Germany national toll free 08001-536 376, Germany international +49 6184 90 6940, Italy +39 02 95059 1, Netherlands +31 76 571 4440, Russia/CIS +7 095 225 11 15, Spain/Portugal +34 93 223 09 18, Switzerland +41 44 454 12 12, UK/Ireland +44 870 609 9203
Asia: China +86 21 6865 4588 or +86 10 5850 3588, India +91 22 5542 9494, Japan +81 45 453 9220, Other Asian countries +852 2885 4613
Countries not listed: +49 6184 90 6940 or +33 2 2803 2000

BRO-CECO2-FRIN-0407

SECTION 2

DESCRIPTION

Lab-Line Imperial III General Purpose Incubators are useful in all types of general incubating and paraffin imbedding.

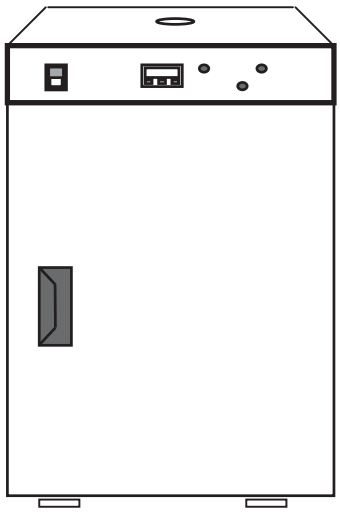
Cabinets are made of heavy-gauge steel with a powder-coated finish for optimum appearance and easy cleaning, while the interior walls are stainless steel to spread warm-wall radiant heat evenly throughout the chamber. Sheathed, low-watt density heaters are in direct contact with chamber walls to allow close temperature control and quick recovery after door openings. This arrangement also minimizes temperature gradients and offers a large working area in the chamber.

A double set of doors, the inner of tempered glass, permit unobstructed viewing of chamber contents without disturbing the interior environment. Slide-out shelving can be positioned to meet user requirements.

A PID microprocessor based controller maintains chamber temperature. An over-temperature safety thermostat controls temperature in the event of primary control failure. A status lamp above each control is lit when the respective control is maintaining power to the heaters.

Incubators are available in three sizes. A grounded 3-prong convenience outlet is supplied in midsize model chambers and 2 outlets are installed in larger models. Models are built for either 120 VAC or 240 VAC power requirements. Models 305M, 306M, 310M and 311M have the same characteristics as those listed above but, in addition, provide mechanical convection. These models use a blower and plenum design to circulates the air within the chamber that allows for rapid temperature and uniformity recovery after door openings.

MODEL 302:



SECTION 3

SPECIFICATIONS

POWER REQUIREMENTS:

302:	120 V, 50/60 Hz, 2.1 amps, 250 watts
302-1:	240 V, 50/60 Hz, 0.7 amps, 155 watts
305:	120 V, 50/60 Hz, 3.3 amps, 400 watts (1 ELECTRICAL OUTLET, 120 V, 500 W TOTAL LOAD)
305M:	120 V, 60 Hz, 3.3 amps, 400 watts (1 ELECTRICAL OUTLET, 120 V, 500 W TOTAL LOAD)
305-1:	240 V, 50/60 Hz, 1.7 amps, 400 watts (1 ELECTRICAL OUTLET, 240 V, 500 W TOTAL LOAD)
305M-1:	240 V, 50Hz, 1.7 amps, 400 watts (1 ELECTRICAL OUTLET, 240 V, 500 W TOTAL LOAD)
306:	120 V, 50/60 Hz, 3.3 amps, 400 watts
306M:	120 V, 60 Hz, 3.8 amps, 450 watts
306-1:	240 V, 50/60 Hz, 1.7 amps, 400 watts
306M-1:	240 V, 50 Hz, 1.9 amps, 450 watts
310:	120 V, 50/60 Hz, 5.0 amps, 600 watts (2 ELECTRICAL OUTLETS, 120 V, 500 W TOTAL LOAD)
310M:	120 V, 60 Hz, 5.0 amps, 600 watts (2 ELECTRICAL OUTLETS, 120 V, 500 W TOTAL LOAD
310-1:	240 V, 50/60 Hz, 2.5 amps, 600 watts (2 ELECTRICAL OUTLETS, 240 V, 500 W TOTAL LOAD)
310M-1:	240 V, 50 Hz, 2.5 amps, 600 watts (2 ELECTRICAL OUTLETS, 240 V, 500 W TOTAL LOAD)
311:	120 V, 50/60 Hz, 5.0 amps, 600 watts
311M:	120 V, 50/60 Hz, 5.8 amps, 700 watts
311-1:	240 V, 50/60 Hz, 2.5 amps, 600 watts
311M-1:	240 V, 50/60 Hz, 2.9 amps, 700 watts

TEMPERATURE:

Range:	From slightly above ambient to 65ºC

UNIT DIMENSIONS:

	INSIDE	OUTSIDE
302 Prefix Models:	13"W x 17"D x 20"H (33 x 43 x 51 cm)	16"W x 21"D x 29½"H (41 x 53 x 75 cm)
305 Prefix Models:	17"W x 21"D x 25"H (43 x 53 x 64 cm)	20"W x 25"D x 34½"H (51 x 64 x 88 cm)
306 Prefix Models:	17"W x 21"D x 25"H (43 x 53 x 64 cm)	20"W x 25"D x 34½"H (51 x 64 x 88 cm)
310 Prefix Models:	37"W x 21"D x 25"H (94 x 53 x 64 cm)	40½"W x 25"D x 34½"H (103 x 64 x 88 cm)
311 Prefix Models:	37"W x 21"D x 25"H (94 x 53 x 64 cm)	40½"W x 25"D x 34½"H (103 x 64 x 88 cm)

	USABLE VOLUME	SHELVES	SHELF AREA
302 Prefix Models:	2.6 cu. ft.	2	2.8 sq. ft.
305 Prefix Models:	5.2 cu. ft.	3	6.9 sq. ft.
306 Prefix Models:	5.2 cu. ft.	3	6.9 sq. ft.
310 Prefix Models:	11.2 cu. ft.	6	13.8 sq. ft.
311 Prefix Models:	11.2 cu. ft.	6	13.8 sq. ft.

BD BACTEC™ FX

Superior patient care with leading microbial recovery and time to detection uniquely combined with safe blood collection, the most intuitive and innovative design and intelligent, cutting edge data management.

Superior efficiency in blood culture from specimen collection to actionable results!

BD BACTEC™ FX Top Unit

BD BACTEC™ FX Stack

BD BACTEC™ FX Instrument Specifications

Physical Dimensions	Top Unit	Stack
Height	88,9 cm	199,5 cm
Width	63,5 cm	63,5 cm
Depth	86.4 cm	86,4 cm
Clearance (rear, left, right)	1,3 cm, 0 cm, 0 cm	1,3 cm, 0 cm, 0 cm
Clearance (front)	68,6 cm	68,6 cm
Vial capacity	200	400
Annual maximum through-put on a 5 day protocol	14.600 vials	29.200 vials

References:
(1) Baron et al. Blood Cultures IV; CUMITECH. ASM Press 2005, p 10
(2) Chapin and Lauderdale. J. Clin. Microbiol. 1996, 34, 543
(3) Miethke et al. J. Clin. Microbiol. 2000, 38, 1036-1041
(4) Carrol et al. J. Clin. Microbiol. 2007, p. 816–821
(5) Eigner et al. 13th ECCMID 2003, P 921
(6) Durmaz et al. J. Clin. Microbiol. 2003, 41, 819-821
(7) Vigano et al. 2004 The New Microbiologica, 27, 235-248
(8) Whittier S. 2003. 103rd General Meeting of the American Society for Microbiology
(9) Spaargaren et al. J. Clin. Microbiol. 1998, 36, 3731–3733
(10) Lee et al. Poster 1389, ECCMID 2008
(11) Sorlin et al. J. Med. Microbiol. 2000, 49, 787 – 791
(12) Jorgensen et al. J. Clin. MIcrobiol. 1997, 35, 53-58
(13) Adler et al. J. Clin. Microbiol. 2003, 41, 5238–5239
(14) Meyer et al. J. Clin. Microbiol. 2004, 42, 773–777
(15) F. Vigano et al. Diagnostic Microbiology and Infectious Disease 2002; 44, 235–240
(16) Fricker-Hidalgo et al. J Clin Microbiol. 2004 ; 42(4): 1855–1856
(17) McDermott et al. Poster P1343 ECCMID 2008
(18) Stamper et al. J. Clin. Microbiol. July 2007, Vol. 45, 2191

Project No. 664-14-427
1st Floor Northwest (1NW) - Clinical Lab Phase lll
Department of Veterans Affairs, San Diego Healthcare System.

Part 1A – Serology Equipment

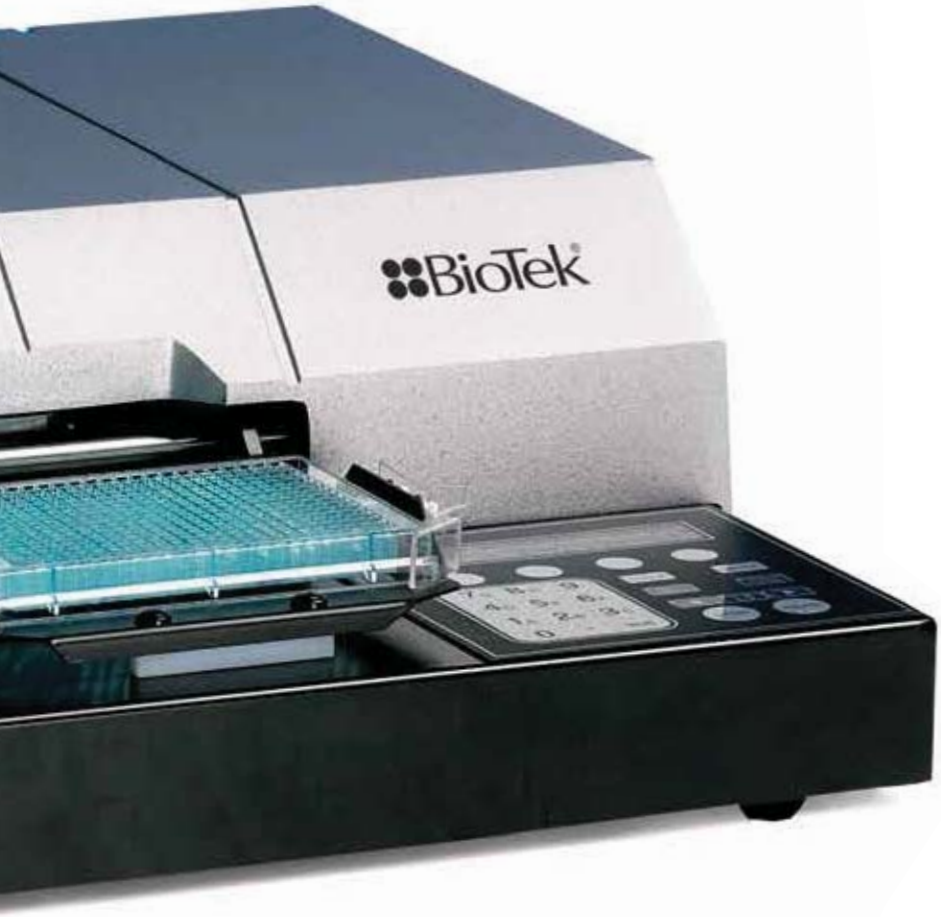
SRD ARCHITECTS INC

D E T E C T I O N

ELx800™ Absorbance Microplate Reader

The ELx800™ is a compact, robust microplate reader ideally suited for applications within the clinical and life science research laboratory. When interfaced with BioTek's Gen5™ Data Analysis Software, the ELx800 applications are expanded to include kinetic and well area scanning measurements in microplates from 6- to 384-well.

When space or budget are limited, the ELx800 offers extensive on-board software, complete with multiple curve fit options, data transformations, cutoff and assay validation calculations. The outstanding performance of this hardworking microplate reader and its proven reliability makes the ELx800 an unbeatable value for your laboratory.



Features:

- Reliable and robust design
- 5 filter capacity
- 6- to 384-well microplate ready
- Gen5 Reader Control Software included
- Extensive onboard software
- Compatible with Gen5 Data Analysis Software

BioTek®
www.biotek.com

Typical Applications:

- ELISA
- Protein assays
- Cytotoxicity

Configurations:

ELX800: 6- to 96-well microplates, 400 – 750 nm wavelength range

ELX800UV: 6- to 96-well microplates, 340 – 750 nm wavelength range

ELX800NB: 6- to 384-well microplates, Terasaki plates, 400 – 750 nm wavelength range

See Web site or price list for configurations and descriptions.

Optional Accessories:

- Gen5™ Data Analysis Software
- Gen5™ Secure (for 21 CFR Part 11 Compliance)
- Absorbance Test Plate
- Product Qualification Package

Specifications:

General

Detection method:	Absorbance
Read method:	End point, kinetic and area scanning under computer control
Microplate types:	6 to 96 wells
	6 to 384-well *(NB option)*
	60/72/96-well Terasaki plates *(NB option)*
Software:	Gen5™ Reader Control Software included
Onboard software:	55 user-programmable protocols

Absorbance

Light source:	Tungsten halogen
Wavelength selection:	Filters
Wavelength range:	400 – 750 nm
	340 – 750 nm (UV option)
Bandpass:	10 nm
Dynamic range:	0 – 3.0 OD
Resolution:	0.001 OD
Filter wheel capacity:	5 positions
Filters supplied:	4 filters (5 with UV option)
OD accuracy:	<1% at 2.0 OD
OD linearity:	<1% at 2.0 OD
	<3% at 3.0 OD
OD repeatability:	<0.5% at 2.0 OD
Reading speed:	96 wells: 30 seconds

Physical Characteristics

Power:	100 – 240 Volts AC. 50/60 Hz
Dimensions:	16.5"D x 15"W x 7"H (41.9 x 38.1 x 17.8 cm)
Weight:	18.5 lbs (8 kg)

Regulatory

For In Vitro Diagnostic use. CE and TUV marked, RoHS compliant.

BioTek®

BioTek Instruments, Inc.
Highland Park, P.O. Box 998
Winooski, Vermont 05404-0998, USA

Tel: 802-655-4040 • Toll-Free: 888-451-5171
Outside the USA: 802-655-4740
www.biotek.com

Performance values represent the average observed factory test values.

**Specifications subject to change.*

Rev. 10/21/14

Project No. 664-14-427
1st Floor Northwest (1NW) - Clinical Lab Phase lll
Department of Veterans Affairs, San Diego Healthcare System.

Part 1B – Micro-Bacteriology Equipment

SRD ARCHITECTS INC

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL
PATHOLOGY
MYCOBACTERIOLOGY - MB03

VersaTREK Instrument Specifications:

	528 Model:	240 Model:	240 Model w/ cart:
Height:	76 1/4 in.; 194cm	40 1/4 in.; 103cm	76 in.; 193cm
Width:	52 in.; 132cm	52 in.; 132cm	52 in.; 132cm
Depth:	30 3/4 in.; 78cm	30 3/4 in.; 78cm	30 3/4 in.; 78cm
Weight (without bottles):	1,212 lbs; 550kg	656 lbs; 298kg	1,158 lbs; 525kg
Distributed load* w/ bottles:	132 lbs/ft^2; 644kg/m^2 (528-22)	70 lbs/ft^2; 339kg/m^2 (240-10)	115 lbs/ft^2; 561kg/m^2 (240-10)
Distributed load* without bottles:	109 lbs/ ft^2; 532kg/m^2 (528-22)	59 lbs/ft^2; 290kg/m^2 (240-10)	104 lbs/ft^2; 508kg/m^2 (240-10)
Heat emission:	2,307 BTU/hr	1,495 BTU/hr	1,495 BTU/hr

*Distributed load refers to the force that the unit exerts across its 'footprint' (width x depth), measured in pound-force per square foot (kilogram-force per square meter).

Additional specifications (both models):

Clearance requirements:

Front:	48 in.; 122cm
Rear:	4 in.; 11cm
Top:	24 in.; 61cm
Side:	4 in.; 11cm

Environmental:

Operating temperature: 59-82ºF; 15-28ºC
Humidity (non-condensing): 10-90%
Operating elevation: 9,842 ft; 3,000m (maximum)

Electrical:

Line voltage: 100/110/220/240 vAC +/-10%
Line frequency: 50/60 Hz +/-5%
Wattage: 800 watts (240-typical); 1000 watts (528-typical)

Certifications:

UL: 3101-1
CSA: 22.2 No. 1010.1
IEC: 61010-1:90 + A1:92 + A2:95
IEC: 61326-1, 2002

Bottle capacity:

	Configuration:	# Drawers:	Max. annual bottle vol. 5-day blood culture	Max. annual bottle vol. 7-day blood culture	Max. annual bottle vol. Myco
240 Model:	96	4	7,000	5,000	850
	144	6	10,500	7,500	1,250
	192	8	14,000	10,000	1,700
	240	10	17,500	12,500	2,100
528 Model:	336	14	24,500	17,500	3,000
	384	16	28,000	20,000	3,500
	432	18	31,500	22,500	3,800
	480	20	35,000	25,000	4,300
	528	22	38,500	27,500	4,700

.

USA and Canada +1 800 871 8909
All Other Inquiries +44 1342 318777

Technical Support
USA and Canada +1 800 642 7029
All Other Inquiries +44 1342 318777

LT2001A/CS/09/11

Thermo SCIENTIFIC
Part of Thermo Fisher Scientific

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL PATHOLOGY
MYCOBACTERIOLOGY - MB03

Thermo Scientific VersaTREK
Automated Microbial Detection System

Value through versatility, flexibility and excellence in recovery

Thermo SCIENTIFIC

The ultimate in versatility: four tests, one platform

The VersaTREK® System is the *only* instrument that offers four FDA-cleared tests on one platform, providing efficiency, space savings and cost containment.

- Blood culture
- Sterile body fluids
- Mycobacteria detection
- *Mycobacterium tuberculosis* susceptibility testing

Need more testing capacity? Simply add drawers for additional testing locations.

Why VersaTREK®

Versatility

"We currently have two VersaTREK 528 units for blood and body fluids, and one 240 for mycobacteria samples and *Mtb* susceptibility. It is nice to know that if we ever have an influx of blood cultures, I can simply place them in our 240 system."

Cost-effectively improves patient care

" … Cost was also a factor and VersaTREK offered our laboratory a cost-effective alternative to our previous system, while improving patient care."

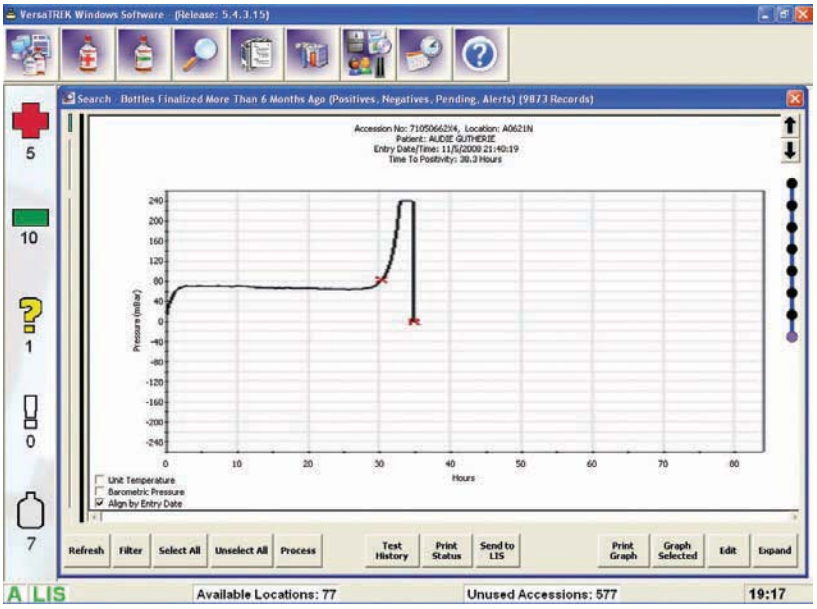
References available upon request

exceptional value

Faster results, fewer limitations, better patient care

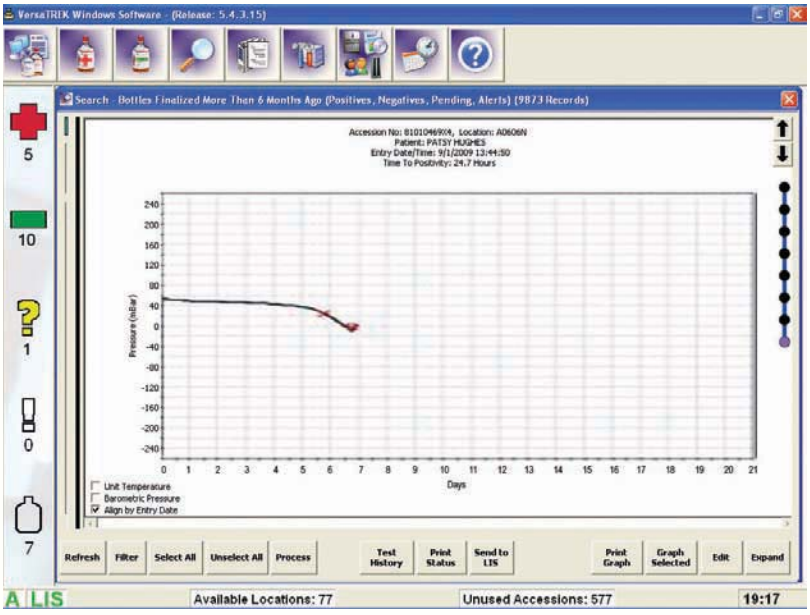
VersaTREK is the *only* system capable of detecting *any* gas produced or consumed by organisms. Because it is not limited to CO_2 production, like other systems, VersaTREK is able to detect a wider range of both common and fastidious organisms. This unique detection technology means faster results with fewer limitations, reducing length of stay and therapy costs, and promoting better patient care.

Organisms that signal on gas *production*



Staphylococcus aureus
Staphylococcus epidermidis
Streptococcus pneumoniae
Enterococcus faecalis
Escherichia coli
Candida albicans
Klebsiella pneumoniae

Organisms that signal on gas *consumption*



Brucella suis
Helicobacter spp.
Nocardia spp.
Campylobacter spp.
Brevundimonas vesicularis
Rhodococcus equi
Trichosporum beigelii

Reduce inventory and costs

Just two bottles covers *all* patient populations

Just two bottles are all you need to recover organisms from adults, pediatrics and patients on antibiotics, reducing media costs and simplifying inventory control. VersaTREK REDOX® media have many distinct features, including:

- Only media FDA-cleared for draws as low as 0.1mL without additional supplements; perfect for pediatric patients
- Largest dilution ratio in the industry (1:9), allowing dilution of serum host factors
- Only FDA-cleared true direct-draw bottle on the market; no need for costly blood-collection adapters

The REDOX two-bottle media system, available in 40 and 80mL sizes, is suitable for all patient scenarios, including pediatric patients.

REDOX 40mL bottles are the *only* FDA-approved blood-culture bottles for true direct draws.

One system, one bottle for *all* Mycobacteria testing

VersaTREK Myco media utilize a unique growth matrix, via cellulose sponges, to provide better detection of all Mycobacteria species.

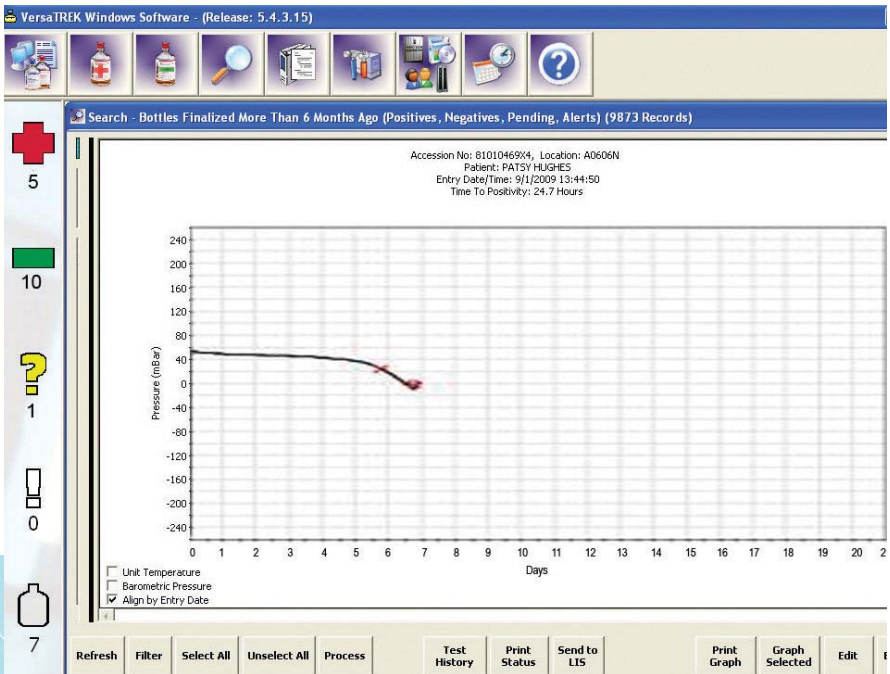
The VersaTREK System offers four FDA-cleared, primary antituberculosis drugs for *Mtb* susceptibility testing, including:

- Rifampin
- Isoniazid
- Ethambutol
- PZA
- Streptomycin*

*CE-marked- not for sale in the U.S.

VersaTREK's detection technology automatically incubates and continuously monitors inoculated Myco culture bottles.

VersaTREK detects mycobacterial growth by automatically monitoring the rate of oxygen consumption within the headspace of the culture bottle every 24 minutes.



Why VersaTREK®

Simple, two-bottle media system

One medium, all sample types

"The VersaTREK System offers additional benefits, such as the simplicity of one medium and instrument for all sample types, including processed blood samples and urine."

Proven media excellence

"The VersaTREK two-bottle media system was equivalent when compared to the BACTEC™ 9240 Standard, Lytic and Plus media."

Inventory efficiency

"We really like the fact that we only have to maintain an inventory of two bottle types, instead of three with our old system."

References available upon request

Simple workflow maximizes efficiency

VersaTREK includes a number of features to promote ease of use and enhance workflow:

- Easy scan function for bottle entry
- Simple bottle removal; no scanning-out when testing has completed
- Intuitive icons to reduce training time
- Rapid resolution of transposed bottle and accession numbers
- *No daily QC required!*

VersaTREK software includes intuitive icons for simple navigation.

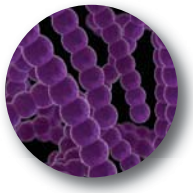
Patient data and test results are at your fingertips with the VersaTREK software system and touch screen monitor.

Critical results in one touch

VersaTREK software provides one-touch access to all patient samples and results. Intuitive icons make navigation simple, and powerful search capabilities provide critical information, even if your Laboratory Information System (LIS) is down.

Proven performance

The VersaTREK's comprehensive detection technology, combined with over 15 years of media excellence, provides superior fastidious organism recovery.



Highly-enriched REDOX media supports a wide range of organisms, enhancing the VersaTREK's ability to better recover fastidious organisms.

Reliable, ongoing support

We are dedicated to providing an efficient and organized conversion process, from accurate order placement and successful equipment installation, through training and validation support. Technical service personnel are available 24-7 with remote access to your VersaTREK, making troubleshooting simple.

Your personal VersaTREK trainer will ensure a seamless installation for your laboratory, from start to finish!

Discover why laboratories around the world are choosing VersaTREK

For more information, contact your Area Account Manager in the U.S. at 800 871 8909, or internationally at +44 1342 318777, or visit www.trekds.com/whytrek to see what people are saying about VersaTREK.

Why VersaTREK®

Accurate results

"Something we noted quite early was the time-to-positivity was shorter than our previous instrument. This was especially apparent with anaerobes and slow-growing organisms."

Better organism recovery

"Since the implementation of the VersaTREK, we have recovered many more anaerobic organisms, *Campylobacter* spp., and unusual Gram negative non-fermenters."

Comprehensive software, customized analysis

"The VersaTREK's software is intuitive, easy to navigate and comprehensive in its ability to provide the user with an unlimited, customized analysis of the patient database. Dependability, ease-of-use and customer service allow us to remain on the cutting edge of sepsis detection."

References available upon request

VersaTREK Instrument Specifications:

	528 Model:	240 Model:	240 Model w/ cart:
Height:	76 1/4 in.; 194cm	40 1/4 in.; 103cm	76 in.; 193cm
Width:	52 in.; 132cm	52 in.; 132cm	52 in.; 132cm
Depth:	30 3/4 in.; 78cm	30 3/4 in.; 78cm	30 3/4 in.; 78cm
Weight (without bottles):	1,212 lbs; 550kg	656 lbs; 298kg	1,158 lbs; 525kg
Distributed load* w/ bottles:	132 lbs/ft^2; 644kg/m^2 (528-22)	70 lbs/ft^2; 339kg/m^2 (240-10)	115 lbs/ft^2; 561kg/m^2 (240-10)
Distributed load* without bottles:	109 lbs/ ft^2; 532kg/m^2 (528-22)	59 lbs/ft^2; 290kg/m^2 (240-10)	104 lbs/ft^2; 508kg/m^2 (240-10)
Heat emission:	2,307 BTU/hr	1,495 BTU/hr	1,495 BTU/hr

*Distributed load refers to the force that the unit exerts across its 'footprint' (width x depth), measured in pound-force per square foot (kilogram-force per square meter).

Additional specifications (both models):

Clearance requirements:

Front:	48 in.; 122cm
Rear:	4 in.; 11cm
Top:	24 in.; 61cm
Side:	4 in.; 11cm

Environmental:

Operating temperature: 59-82ºF; 15-28ºC
Humidity (non-condensing): 10-90%
Operating elevation: 9,842 ft; 3,000m (maximum)

Electrical:

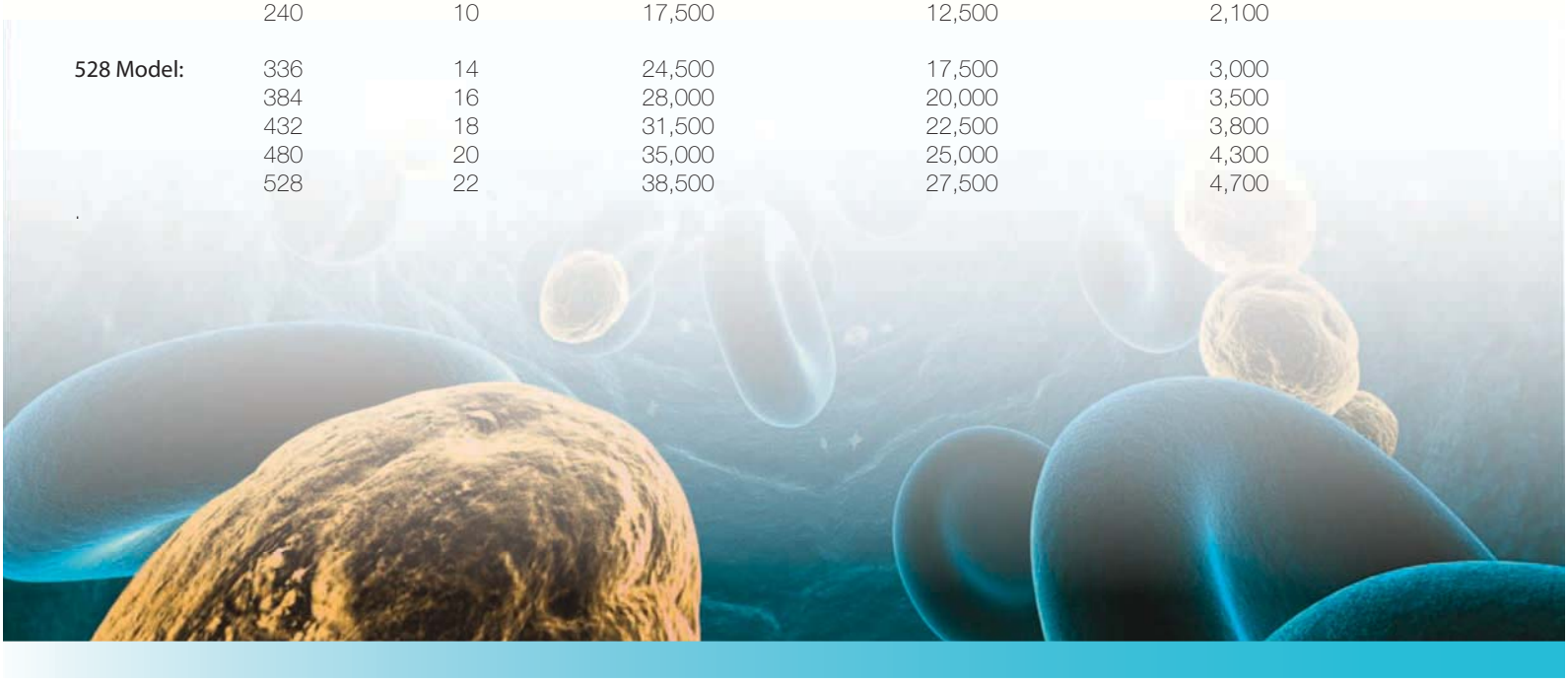
Line voltage: 100/110/220/240 vAC +/-10%
Line frequency: 50/60 Hz +/-5%
Wattage: 800 watts (240-typical); 1000 watts (528-typical)

Certifications:

UL: 3101-1
CSA: 22.2 No. 1010.1
IEC: 61010-1:90 + A1:92 + A2:95
IEC: 61326-1, 2002

Bottle capacity:

	Configuration:	# Drawers:	Max. annual bottle vol. 5-day blood culture	Max. annual bottle vol. 7-day blood culture	Max. annual bottle vol. Myco
240 Model:	96	4	7,000	5,000	850
	144	6	10,500	7,500	1,250
	192	8	14,000	10,000	1,700
	240	10	17,500	12,500	2,100
528 Model:	336	14	24,500	17,500	3,000
	384	16	28,000	20,000	3,500
	432	18	31,500	22,500	3,800
	480	20	35,000	25,000	4,300
	528	22	38,500	27,500	4,700



USA and Canada +1 800 871 8909
All Other Inquiries +44 1342 318777

Technical Support
USA and Canada +1 800 642 7029
All Other Inquiries +44 1342 318777

LT2001A/CS/09/11

Thermo SCIENTIFIC

Part of Thermo Fisher Scientific

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL PATHOLOGY
MYCOBACTERIOLOGY - MB06

Technical Data Sheet
Laboratory Refrigerator

Model
i.Series iLR120

Specifications

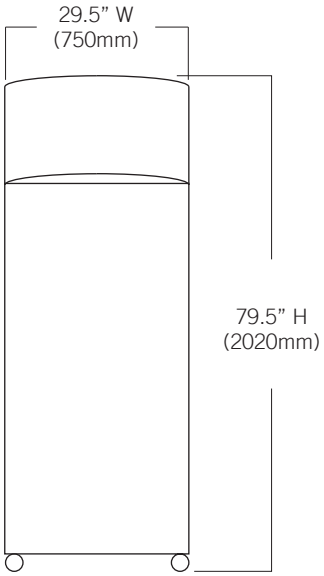
Application, Rating and Electrical Data	
Application	Storage of medical and scientific products
Storage Volume	20.2 cu ft (572 L)
Temperature Range	2° to 10°C
Electrical Power	115V 60Hz 230V 50Hz 230V 60Hz
Maximum Current	7.5 FLA / 4.2 FLA / 4.2 FLA
Building Supply Rating	15 amp dedicated ground circuit
Power Plug / Power Cord Length	NEMA 5-15 hospital grade plug (115V) CEE 7/7 plug (230V 50Hz) NEMA 6-15 hospital grade plug (230V 60Hz) 8-10 ft (2439-3048 mm)
Certification / Agency Listing	QPS (Certified to UL and CSA Standards)
Indoor / Outdoor Use	Indoor use only
Application Environment	Non-corrosive, non-flammable, non-explosive, 15°C to 32°C (59°F to 90°F)
Refrigeration System	
Refrigeration System	Forced-air circulation
Compressor / Number	.33 HP hermetic / 1
Condenser Type / Number	Air-cooled fin and tube / 1
Expansion Device	Cap tube
Evaporator Type	Air-cooled fin and tube
Defrost Method	Automatic
Refrigerant Charge	R134A Non-CFC
Performance Data	
Uniformity	+/-1.5°C at 4°C Setpoint
Warranty	
Rel.i™ Plus	7 years compressor, 2 years parts, 1 year labor

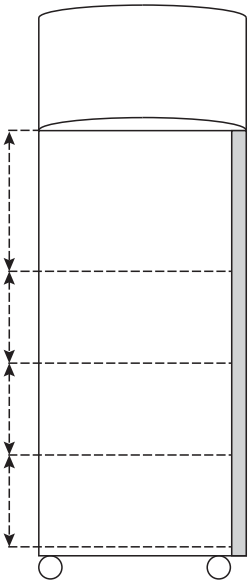
Controller	
Interface	i.C³® eye-level, color touchscreen
Power Switch	On/Off - All Circuit breaker - 230V only
Controller Type	Microprocessor with touchscreen input and display. Includes USB port for data retrieval.
Security	Lockable door, password protected settings, optional PIN access
Control Sensor	RTD
Communication Ports	(2) USB Ports (1) RJ45 Hub (1) RS232 Port (optional)
High / Low Alarms	Fully adjustable
High / Low Alarm Test	Automatic (Peltier)
Door Ajar Alarm	Fully adjustable
Power Failure Alarm	Yes
Condenser Temperature Alarm	Fully adjustable
Event Log	All alarms, door openings, dowload via USB
Temperature Log	60 days, download via USB
Access Log	60 days, download via USB
Interactive Temperature Graph	Yes
Battery Back-up	20 hour display and alarm battery back-up for i.C³® touchscreen (rechargeable 12V, lead acid battery)
Dimensions and Construction	
Interior (w x h x d)	24.75 x 58.25 x 24.25 in 29 x 1480 x 616 mm
Exterior (w x h x d)	29.5 x 79.5 x 29.5 in 750 x 2020 x 750 mm
Overall Ext (w x h x d) (Inc door handle, electrical panel, and evaporation tray)	29.5 x 79.5 x 32.5 in 750 x 2020 x 826 mm
Insulation	Minimum of 2" (51mm) non-CFC foamed urethene insulation
Exterior / Interior Finish	Bacteria-resistant powder coating
Access Ports	Sidewall with interior and exterior plugs Top for external monitoring probe(s)
Interior Storage / Capacity	4 epoxy coated shelves 22 x 23 in (559 x 585 mm) 100 lb (46 kg) max capacity / shelf
Lighting	Adjustable LED Auto-on, on/off switch
Casters	Standard / swivel locking
Integrated Access Control	Optional - Electromagnetic lock via i.C³ User Interface PIN
Net Weight	473 lb (215 kg)
Shipping Weight	563 lb (256 kg)
Clearance Requirements	Minimum of 8" (203mm) above and 3" (76mm) behind unit.
Options / Accessories	Chart Recorder, Floor & Wall Bracket Kit, Remote Alarms, Leveling Feet, Stainless Steel Interior, Remote Lock Adapter Kit, Extended Warranty

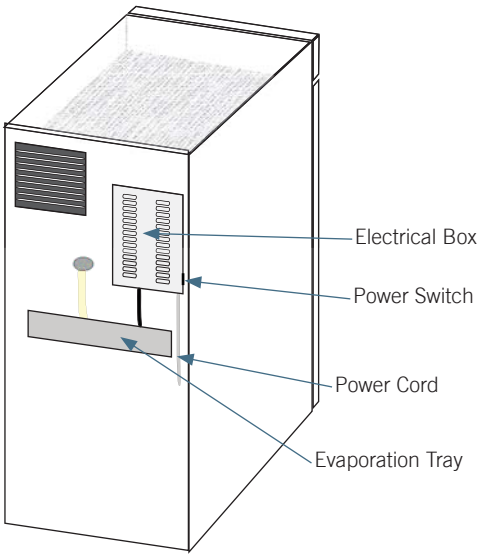
bsi. ISO 13485 Medical Devices Quality Management FM 536286
CE 0086
RoHS COMPLIANT

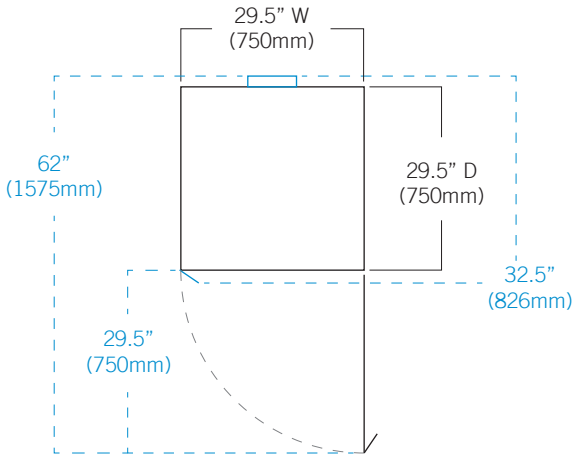
Technical Data Sheet
Laboratory Refrigerator

i.Series iLR120









Helmer Scientific | 14400 Bergen Boulevard | Noblesville, IN 46060 | USA
+1.317.773.9073 | www.helmerinc.com

Helmer SCIENTIFIC

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL PATHOLOGY
MIYCOBACTERIOLOGY - MB12
MODEL - "A" 20X20X38 DOUBLE DOOR

TECHNICAL DATA SHEET

PRIMUS CLINICAL – Small Size Sterilizers

These sterilizers are designed for Clinical applications including surgery, central sterile supply and clinical laboratories. PRIMUS sterilizers are designed and manufactured in the USA according to Quality Management Systems which are in compliance with ISO 9001:2000, ISO 13485:2003, CMDCAS and FDA's Good Manufacturing Practice (GMP) for Medical Devices: General Regulation (21CFR Part 820). Small size sterilizers are one segment of 12 standard clinical sizes manufactured by PRIMUS.

16"x16"x26" 26"x26"x39" 20"x20"x38"

STERILIZER DESIGN

The pressure vessel is the heart of any sterilizer. PRIMUS offers simple straight forward design. All PRIMUS pressure vessels are constructed of solid stainless steel and are fabricated by PRIMUS in our quality controlled, ASME facility. The interior chamber surface is polished to a mirror finish of <10µ in. Ra. The brilliant Pri-Mirror ® reflective chamber finish sets the highest standard for cleanliness and offers easy spill clean-up and resistance to staining and degradation.

PRIMUS rectangular chambers eliminate the wasted space and high utility costs common to old-style cylindrical or elliptical chambers. (E.g. The PRIMUS 26 cu. ft. 26"x26"x67" sterilizer with vertical door, occupies less floor space and provides greater capacity than the conventional 24"x36"x48" hinged radial arm door sterilizers.)

PRIMUS' unique design reduces the high service cost associated with conventional hinged/radial arm doors and, most importantly, provides an added margin of operator safety.

PRIMUS vertically operating doors operate with minimal hand pressure. Where hands-free door operation is desired (for single door units only), a mushroom button actuated by elbow/forearm is offered. An optional foot switch is available. For double door units ordered with the Power Door option the doors are operated through the use of the touchpad only.

The PRIMUS vertically sliding door design is efficient, reliable and inherently safe

STERILIZER CYCLES

All PRIMUS Sterilizers include Gravity, Vacuum, and Liquid cycle settings. A Test/Vac cycle is provided for utilizing Bowie-Dick™ tests.

For surgical packs, select one of the vacuum cycles. For the sterilization of liquids in open or vented containers, select a liquid cycle.

The time-tested and reliable PRIMUS PSS500 Microcomputer Control is an industrial microprocessor providing accuracy and automation for all customer requirements. This simple, versatile, control has become the first choice for both sterilizer users and service technicians.

PRIMUS Sterilizer Company, LLC • 117 South 25th Street • Omaha, NE 68131
Phone (402) 344-4200 • Fax (402) 344-4242 • info@primus-sterilizer.com • www.primus-sterilizer.com

Made In The USA

PURCHASING TECHNICAL DATA SHEET

TECHNICAL DATA SHEET

GENERAL *(Options italicized)*

All models include Vacuum, Gravity and Liquids cycles. *A Low Temperature Flowing Steam option provides flowing steam at low temperatures for Research laboratories or specific applications.*

VESSEL MATERIAL AND CONSTRUCTION

The sterilizer will have a double-wall design providing for a fully jacketed pressure vessel. The chamber cross section will be rectangular with width and height dimensions to include:

AA	16”x16”x26”	C	26”x26”x49”
A	20”x20”x38”	D	26”x26”x67”
B	26”x26”x39”		

The vessel material will be non-laminated solid stainless steel plate/sheet. The chamber, head-ring and door plate material will be 316L stainless steel with an interior Pri-Mirror ® finish of <10µ in. Ra.

DESIGN and MANUFACTURING APPROVALS

The vessel will be designed and constructed to ASME code Section VIII Division I and pressure rated for 45 PSIG and full vacuum. ASME Code Stamp and U-1 form shall bear the name of PRIMUS as the specified US manufacturer.

The sterilizer will be manufactured according to Quality Management Systems which are in compliance with ISO 9001:2000, ISO 13485:2003, CMDCAS, FDA and will be UL listed and in conformance with CSA requirements.

DOOR CONSTRUCTION

An inherently safe design, counterbalanced vertically operating door will be operable with minimal hand pressure and will operate within the overall dimensions of the sterilizer frame. In the open position, the insulated door shall be secured behind a panel preventing the operator from contact with hot surfaces. An interlock will prevent cycle start unless door is closed and locked.

GENERAL CONSTRUCTION

The vessel will be insulated with 1" semi-rigid high temperature fiberglass board/blanket insulation overlaid with formed aluminum paneling and mounted in a structural steel frame. The frame will be enamel coated and fitted with adjustable legs on self-centering floor pads. The fascia and side panels will be 16-gauge, type 304 stainless-steel, removable for easy service access.

Water Conservation

To conserve water and assure effluent exhausted to drain is 140^{O}F or below, PRIMUS provides quench water on demand for exhaust effluent.

EQUIPMENT WARRANTY

Sterilizer pressure vessels manufactured by PRIMUS are warranted against defects in workmanship and materials under normal use and operation for fifteen years where the sterilizer is continually maintained under PRIMUS service contract.

SERVICE and EQUIPMENT ACCESS

Standard service access, when facing the unit, will be from left side and top. Wiring will be laid side-by-side and mechanically secured flat against the metal insulation cover. All wiring will be clearly labeled and readily visible for visual tracing. Piping components will be threaded rigid brass and flared copper fittings, positioned with sufficient space for removal and replacement without disassembly of the entire piping assembly. Wiring and piping components shall be nonproprietary, industrial grade, available through Authorized Service Agencies, local supply house, or direct from PRIMUS.

STEAM SOURCE

Steam will be from an in-house steam source in the quantity and quality specified. *Optional electric steam boiler, clean steam boiler or steam-to-steam generator may be specified. Contact PRIMUS for additional information.*

CONTROLS

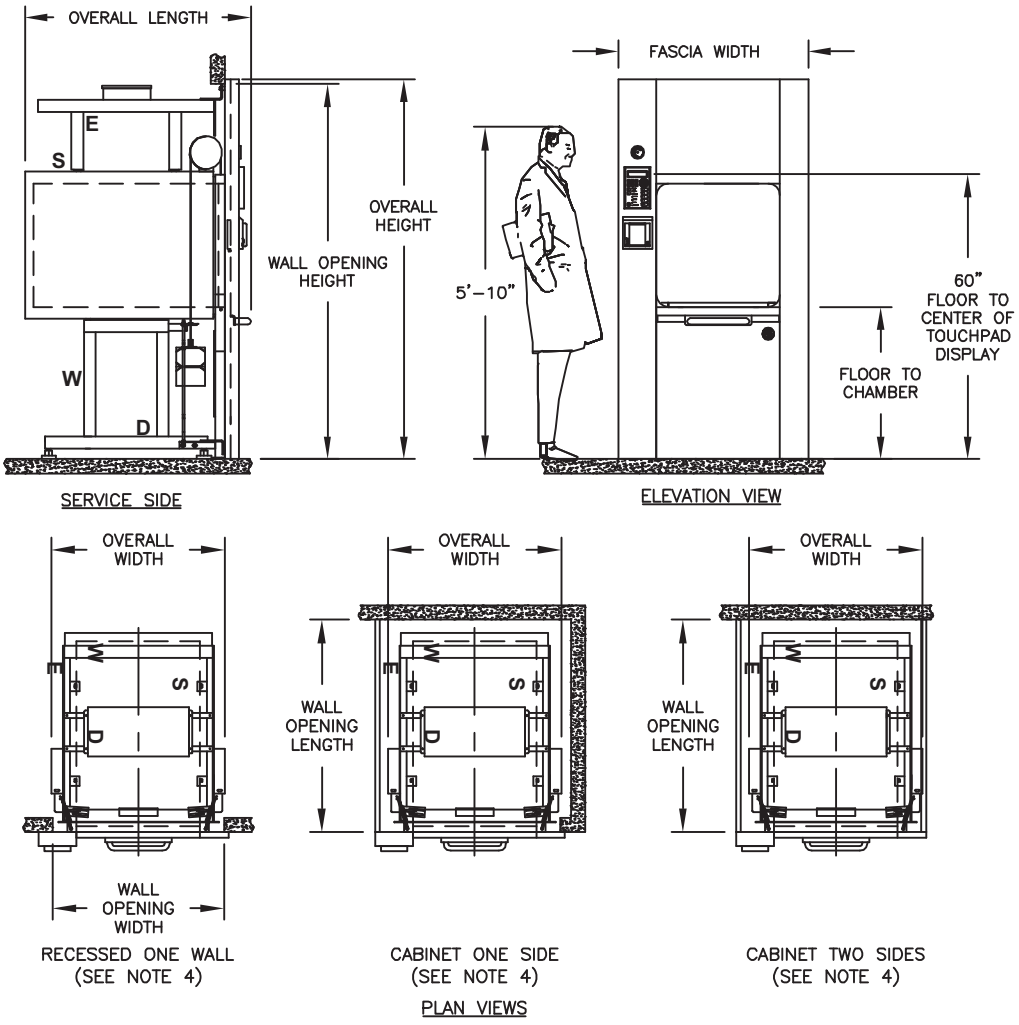
A PSS500 microcomputer will offer a selection of eight (8) separate programs for the sterilization of wrapped goods, hard-goods, liquids and test cycles. Cycle parameters may be set by the user and are adaptable to a wide range of products. Alarms are annunciated, displayed and printed. Cycle process parameters will be displayed and recorded throughout the cycle. A side-mounted control panel and a thermal printer dot-matrix technology, with no moving parts in the print head, and 32 characters per line printing. A copy of the sterilization cycle will be available at the end of the run.

Standard Control Panel /Printer Arrangement

PRIMUS Clinical - Small Sterilizers

SINGLE DOOR

TECHNICAL DATA SHEET



VOLUME/DIMENSIONS CHART

*Refer to General Arrangement (GA) drawings for details and final connection point to utility services (S-Steam, W-Water, D-Drain, E-Electrical, A-Air).

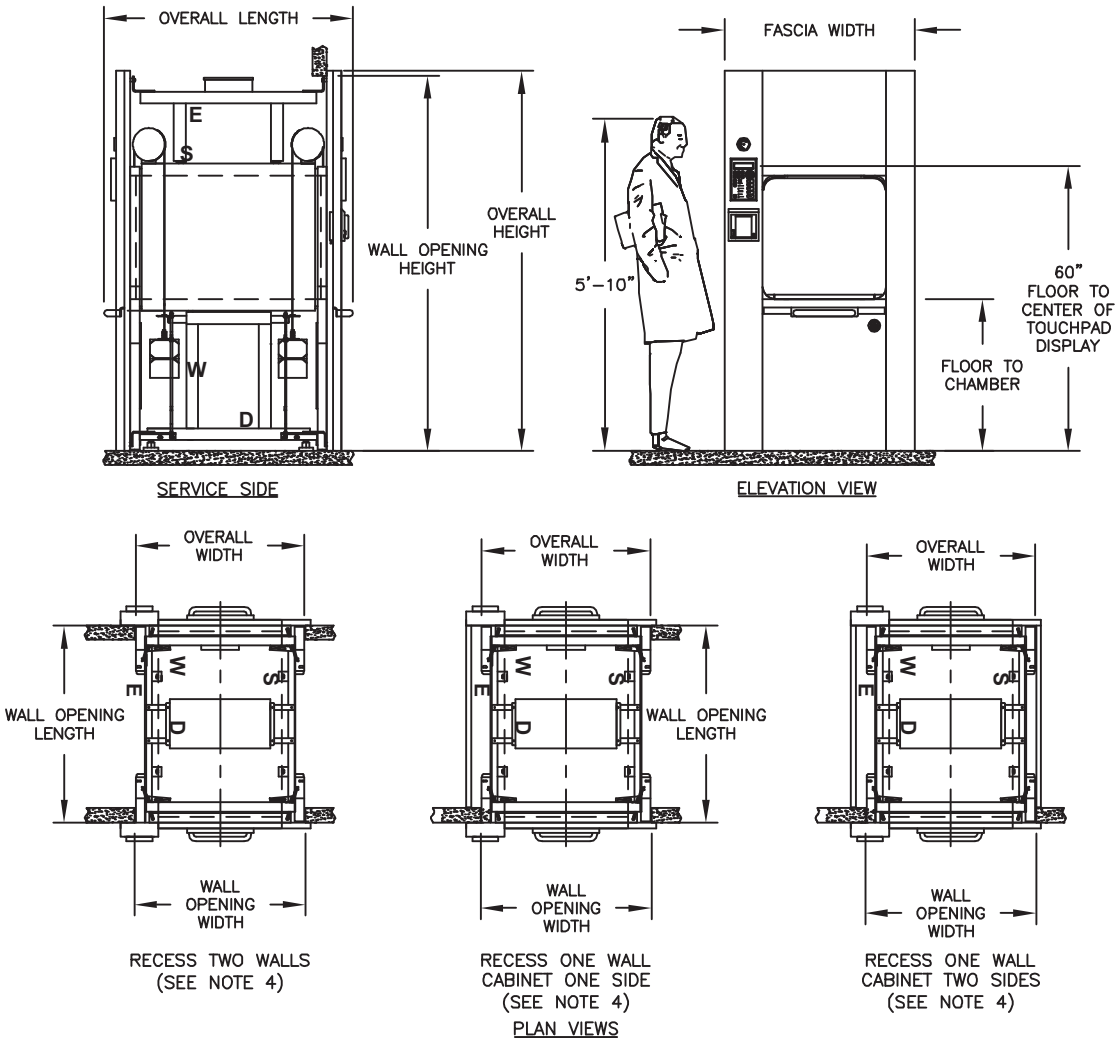
MODEL	AA	A	B	C	D
Chamber Size (w x h x l) inches/millimeters	**16 x 16 x 26 406.4 x 406.4 x 660.4**	**20 x 20 x 38 508 x 508 x 965.2**	**26 x 26 x 39 660.4 x 660.4 x 990.6**	**26 x 26 x 49 660.4 x 660.4 x 1244.6**	**26 x 26 x 67 660.4 x 660.4 x 1701.8**
Chamber Capacity	**3.9 ft³ / .11 m³**	**8.8 ft³ / .25 m³**	**15.3 ft³ / .43 m³**	**19.2 ft³ / .54 m³**	**26.2 ft³ / .74 m³**
Overall Width	25.38 / 644.6	29.25 / 743.0	35.50 / 901.7	35.50 / 901.7	35.50 / 901.7
Overall Height [1]	74.00 / 1879.6	74.00 / 1879.6	80.00 / 2032.0	80.00 / 2032.0	80.00 / 2032.0
Overall Length (SD) [2, 3]	33.88 / 860.5	46.38 / 1178.0	47.56 / 1208.0	57.56 / 1462.1	75.50 / 1917.7
Wall Opening Width [4]	26.00 / 660.4	30.00 / 762.0	36.00 / 914.4	36.00 / 914.4	36.00 / 914.4
Wall Opening Height	73.00 / 1854.2	73.00 / 1854.2	79.00 / 2006.6	79.00 / 2006.6	79.00 / 2006.6
Wall Opening Length	32.00 / 812.8	44.00 / 1117.6	46.00 / 1168.4	56.00 / 1405.6	74.00 / 1857.4
Fascia Width	30.00 / 762.0	34.00 / 863.6	40.00 / 1016.0	40.00 / 1016.0	40.00 / 1016.0
Floor to Chamber	38.50 / 977.9	38.50 / 977.9	32.00 / 812.8	32.00 / 812.8	32.00 / 812.8

1. Fascia extends 1" beyond wall opening on each side overlapping the wall and sealing the opening.
2. Allow minimum 2" clearance at rear of recessed unit only. Cabinet side models have rear clearance built in.
3. Handle projects from the face of the facia to the outer radius of the handle 2.375" for Models AA & A. Models B, C, & D the handle projects 4.25".
4. Contact PRIMUS for alternative wall opening.
5. Standard Left Side Service/equipment access shown. Optional right side access is available.

PRIMUS Clinical - Small Sterilizers

TECHNICAL DATA SHEET

DOUBLE DOOR



VOLUME/DIMENSIONS CHART (CON'T)

*Refer to General Arrangement (GA) drawings for details and final connection point to utility services (S-Steam, W-Water, D-Drain, E-Electrical, A-Air).

MODEL	AA	A	B	C	D
Chamber Size (w x h x l) inches/millimeters	**16 x 16 x 26 406.4 x 406.4 x 660.4**	**20 x 20 x 38 508 x 508 x 965.2**	**26 x 26 x 39 660.4 x 660.4 x 990.6**	**26 x 26 x 49 660.4 x 660.4 x 1244.6**	**26 x 26 x 67 660.4 x 660.4 x 1701.8**
Chamber Capacity	**3.9 ft^3 / .11 m^3**	**8.8 ft^3 / .25 m^3**	**15.3 ft^3 / .43 m^3**	**19.2 ft^3 / .54 m^3**	**26.2 ft^3 / .74 m^3**
Overall Width	25.38 / 644.6	29.25 / 743.0	35.50 / 901.7	35.50 / 901.7	35.50 / 901.7
Overall Height [1]	74.00 / 1879.6	74.00 / 1879.6	80.00 / 2032.0	80.00 / 2032.0	80.00 / 2032.0
Overall Length (DD) [2]	35.94 / 912.9	47.25 / 1197.4	52.44 / 1331.9	62.44 / 1585.98	80.44 / 2043.18
Wall Opening Width [3]	26.00 / 660.4	30.00 / 762.0	36.00 / 914.4	36.00 / 914.4	36.00 / 914.4
Wall Opening Height	73.00 / 1854.2	73.00 / 1854.2	79.00 / 2006.6	79.00 / 2006.6	79.00 / 2006.6
Wall Opening Length	27.69 / 703.3	40.44 / 1027.2	41.44 / 1052.6	51.44 / 1306.6	69.44 / 1763.8
Fascia Width	30.00 / 762.0	34.00 / 863.6	40.00 / 1016.0	40.00 / 1016.0	40.00 / 1016.0
Floor to Chamber	38.50 / 977.9	38.50 / 977.9	32.00 / 812.8	32.00 / 812.8	32.00 / 812.8

1. Fascia extends 1" beyond wall opening on each side overlapping the wall and sealing the opening.
2. Handle projects from the face of the facia to the outer radius of the handle 2.375" for Models AA & A. Models B, C, & D the handle projects 4.25".
3. Contact PRIMUS for alternative wall opening.
4. Standard Left Side Service/equipment access shown. Optional right side access is available.

ARCHITECTURAL NOTES:

1. Allow sufficient space for traps, shut-off's, filters and other utility supply components.
2. Utility (service disconnects) shall be provided and installed "By Others".
3. Building or structure modifications to accommodate the sterilizer, as well as, sterilizer shoring, rigging, cribbing and/or crane requirements into the facility shall be provided "By Others".
4. Provide maximum mechanical and service access space, a minimum of 24", additional space required when boiler specified. See General Arrangement drawing, for placement of ancillary equipment and service access.
5. Some options affect utility services and overall dimensions.
6. Water Quality - refer to page 6
7. The Manufacturer's Equipment Warranty does not cover failure due to improper utility provisions.
8. Drawings not to scale.
9. Wall thickness must be provided on single and double door models recessed through 1 or 2 walls, with cabinet sides.

UTILITY SERVICES

Stub-in utility services within 6'-0" of final connection to sterilizer. Optimum sterilizer performance requires the specified utilities.

	STEAM (S) Building Steam Supply . **Pipe Size:** 3/4" NPT . **Quality:** Condensate free 97% to 100% saturated vapor (suitably trapped to ensure dry steam and filtered to remove particulates) . **Pressure:** 50-80 PSIG Dynamic		**WATER (W)** Cold Water Supply . **Pipe Size:** 3/4" NPT . **Temperature:** < 70° F . **Pressure:** 50-70 PSIG Dynamic		**AIR (A)** Instrument Air . **Connection:** See Below . **Quality:** Dry and oil free . **Pressure:** 60-80 PSI Dynamic	**DRAIN (D)** Building Drain System Mimimum 2" . **Location:** Locate floor sink directly under sterilizer **Note:** 1.) Exhaust discharge is cooled to < 140°F 2.) 12" x 12" x 8" floor sink is recommended by PRIMUS	**ELECTRICAL (E)** Building Power Supply - Dedicated Circuit . **Volts**: 110 . **Phase:** Single . **Amps:** 10 **Note:** Additional circuits required for ancillary and optional equipment i.e., vacuum pump, boost pump, boiler, etc.
MODEL	**NPT**	**LBS/HR (KG/HR)**	**NPT**	**GPM (Liter)**	**NPT**	**NPT** (Discharge Pipe Size)	
AA	3/4"	50.0 (22.68)	3/4"	8 (30)	1/4"	3/4"	
A	3/4"	65.0 (29.48)	3/4"	8 (30)	1/4"	3/4"	
B	3/4"	100.0 (45.36)	3/4"	8 (30)	1/4"	3/4"	
C	3/4"	134.0 (60.78)	3/4"	14 (53)	1/4"	1"	
D	3/4"	204.0 (92.53)	3/4"	14 (53)	1/4"	1"	

HVAC DATA Heat loss, at ambient of 70° F.

	MODEL	**KBTU'S/HR**
SINGLE DOOR: Through one wall, at fascia	AA	1.5
	A	2.2
	B	4.1
	C	4.1
	D	4.1
SINGLE DOOR: Through one wall, service area	AA	1.9
	A	3.4
	B	5.7
	C	7.1
	D	9.7
SINGLE DOOR: Free standing, cabinet total	AA	3.4
	A	5.6
	B	9.8
	C	11.2
	D	13.8

	MODEL	**KBTU'S/HR**
DOUBLE DOOR: Through one wall, at fascia	AA	1.5
	A	2.2
	B	4.1
	C	4.1
	D	4.1
DOUBLE DOOR: Through one wall, service area	AA	3.3
	A	5.1
	B	7.8
	C	9.7
	D	11.5
DOUBLE DOOR: Through two walls, at each fascia	AA	1.5
	A	2.2
	B	4.1
	C	4.1
	D	4.1
DOUBLE DOOR: Through two walls, service area	AA	1.8
	A	2.9
	B	3.7
	C	5.6
	D	7.4

TECHNICAL DATA SHEET

Use the following pages to custom design your sterilizer by checking the boxes of the configuration and options required for your project. Transfer all items checked to the Technical Worksheet (Page 12) and fax to PRIMUS Sales Department or to your local Sales Representative for a quotation. If you do not find an option or size listed to meet your requirements, please contact our Project Manager for additional information and assistance with a custom design to meet your specifications.

Model Number Notation

SD = Single Door
DD = Double Door

PSS5-__-M__ __

AA
A
B
C
D

S = House Steam
E = Electric Boiler

Five models are offered:

AA - 16" x 16" x 26"
A - 20" x 20" x 38"
B - 26" x 26" x 39"
C - 26" x 26" x 49"
D - 26" x 26" x 67"

A detailed formatted specification, suitable for inclusion in formal contract documents, is available on request.

Note: Use the above format to determine PRIMUS Model number and insert below and on Page 12, Technical Worksheet.

PRIMUS Clinical Steam Pressure Sterilizer, Model Number PSS5_____.

SELECT CONFIGURATION

Door
- ❑ DA - Single Door
- ❑ DB - Double Door

Cabinet
- ❑ CD - Panels Both Sides
- ❑ CCL - Left Side Panel
- ❑ CCR - Right Side Panel
- ❑ CE - Top Panel

Recessed
- ❑ CA - One Wall
- ❑ CB - Two Walls

Service and Equipment Access
- ❑ Left Side (Standard)
- ❑ Right Side

Steam Source
- ❑ House Supply
- ❑ Electric Boiler[1,2,4]
  - ❑ EB1 - 208/3 phase
  - ❑ EB2 - 240/3 phase
  - ❑ EB3 - 480/3 phase
  - ❑ Other _____
- ❑ EB0[3] - Auto. Blowdown

1. Electric boilers are available in Carbon Steel or Stainless Steel Electric. Carbon Steel Boilers are integral on AA, A, B sizes. Additional options, if selected, may require stand-alone on these sizes. Specify whenever stand-alone is required on any model.
2. Contact PRIMUS for overall dimensions and utility connections.
3. Low Water Cutoff is standard and the, “automatic reset” feature is disabled with this option. The boiler will need to be manually reset.
4. Water Quality - For best results, feed water supply should be evaluated prior to initial start-up by a reputable water conditioning company. If the mineral content exceeds recommended limits, various external treatment processes (water softener, water conditioning, etc. may be used to correct the problem. Contact PRIMUS for further

CLINICAL LABORATORY CONFIGURATIONS

☐ Low Temperature Flowing Steam P14

For media preparation, formula and similar uses. Pasteurization is accomplished with flowing steam. In addition to standard sterilizer temperature ranges, this option allows cycles to operate in the range of 168°F (76°C) to 220°F (104°C). Not intended for reprocessing reusable medical devices.

CONTROLS AND RELATED OPTIONS

(Contact PRIMUS for details and performance specifications)

☐ PSS500 Control C6

PSS500 microcomputer with eight (8) factory preset cycles; seven (7) programmable and 1 Test cycle are standard. A vertical touchpad contains a Liquid Crystal Display (LCD) mounted on a side-mounted control panel with a thermal printer. Cycle progression is displayed by Light Emitting Diodes (LEDs) on the operator panel and printed, 32 characters per line printing. A second copy of the entire sterilization cycle printable at the end of the run.

☐ Thermal Printer R7

Thermal dot-matrix printer with take-up reel and 32 character per line printing is standard. Second sterilization cycle report available at the end of the run.

☐ Remote Mount Control Panel C10

Mount control panel in separate housing adjacent to or up to 35 feet away from the sterilizer.

☐ Serial Data Output C11

Supervisory use to capture electronic record of each sterilization cycle. Cycle hard copy and display data is transmitted via RS232 in real time to a remote computer, up to 100 feet away, for display and recording. Hard copy records may be printed from the computer.

Contact PRIMUS for additional configuration options.

FACTORY PRESET CYCLES				
Load Type	Cycle Number	Cycle Type	Sterilize Temp	Sterilize Time (min)
Double Wrapped Instruments 16 lbs each tray	1	Vacuum	273°F (134°C)	15
Unwrapped Nonporous Single Instrument	2	Vacuum	273°F (134°C)	4
Double Wrapped Instrument Trays 16 lbs each tray	3	Vacuum	273°F (134°C)	4
Textile Pack 12 lbs	4	Vacuum	273°F (134°C)	4
Unwrapped Nonporous Single Instrument	5	Gravity	273°F (134°C)	4
Fabric Packs maximum size: 12x12x20, 12 lbs	6	Gravity[1]	253°F (122.8°C)	30
Vented Borosilicate glass containers, 500 ml or smaller	7	Liquids	253°F (122.8°C)	30
Bowie-Dick Test	8	Test (VAC)	273°F (134°C)	3-1/2

1. Gravity cycles must be loaded in a manner to ensure no air is entrapped in the load. E.g., invert pans, beakers and similar items.

1 - Liquid Crystal Display (LCD)
2 - Light Emmitting Diode (LED)
3 - Cycle Buttons
4 - Heart Buttons

GENERAL OPTIONS

☐ **Validation Port, 1 inch V3.1**
Provides chamber penetration to accommodate various monitoring/control probes. Standard on B, C, and D models, optional for Models AA and A.

☐ **Seismic Restraints V8**
Required in areas prone to seismic hazards. Secures sterilizer to building but allows for leveling. Designed to current California Code.

☐ **Power Operated Door DF**
On small size models, replaces standard manual fingertip door operation with hydraulic power operation actuated by mushroom-button switch mounted adjacent to chamber. An optional foot switch is available for single door units. Double Door Models include control panel pad actuation in lieu of mushroom button.

UTILITY - RELATED OPTIONS

☐ **Boost Pump for Low House Water Pressure P3**
Delivers required dynamic water pressure for efficient operation. Requires specified GPM flow. *Contact PRIMUS for details and performance specifications.*

☐ **Transformers E1**
Reduces line voltage to required 110 VAC for operation of sterilizer controls.

	E1A	220 vac to 110 vac
	E1B	480 vac to 110 vac
	E1C	480/240 to 240/120, 1 phase, 0.5 KVA

☐ **Uninterruptible Power Supply E2**
In the event of electrical power loss and no emergency electrical power to sterilizer, this option provides electrical power to operate control system for up to 30 minutes, to complete the cycle. This option is a dedicated power source for the electronic controls only and will not support any power requirements for heavy power load components (boilers, pumps, compressors, etc.).

LOADING EQUIPMENT

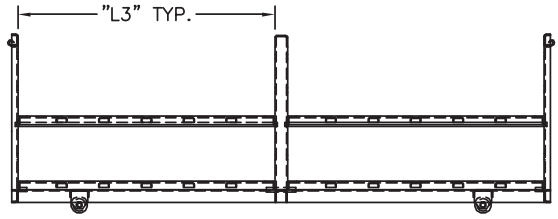
Standard chamber shelving includes a fixed, removable, wire mesh bottom shelf. As an option an extendable bottom shelf, is available. Optional additional chamber shelf(ves) may be specified. *Shelving not applicable to Model D.*

Loading cart includes one bottom and one intermediate shelf with four adjustable levels. Additional shelves are available. Cart frames and shelves are 316L stainless steel welded, ground and polished. Shelf surfaces are stainless steel wire mesh. Transfer carriages include swivel casters with swivel locks and 5” wheels with wheel brakes.

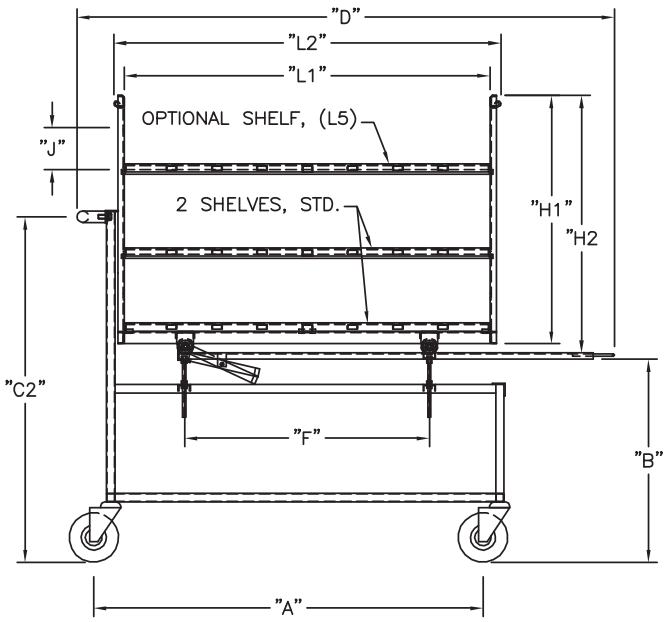
	L1	Removable Bottom Shelf
	L2	Extendable Bottom Shelf
	L3	Additional Chamber Shelf
	L4	Loading Cart (n/a 16”x16”x26” Model)
	L5	Additional Cart Shelf
	L6	Transfer Carriage

NOTE*:* Loading cart and transfer carriages are recommended for chamber lengths 48 inches or longer.

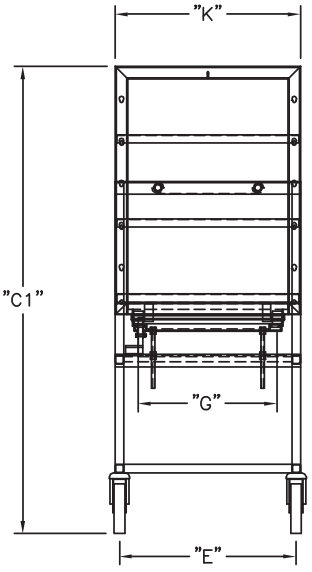
Contact PRIMUS for special loading equipment requirements and/or for weight and load capacity.



SIDE VIEW (60" CHAMBER OR LONGER)



SIDE VIEW



END VIEW

Transfer Carriage and Loading Cart Dimensions[1]

CHAMBER SIZE	CARRIAGE QTY	CART QTY	A	B	C1	C2	D	E	F
AA-16"x16"x26"	N/A	N/A							
A - 20"x20"x38"	1-L6	1-L4	37.18"	38.50"	55.63"	48.06"	54.00"	19"	34.50"
B - 26"x26"x39"	1-L6	1-L4	38.25"	32"	53.63"	41.06"	55.00"	21"	35.50"
C - 26"x26"x49"	1-L6	1-L4	48.25"	32"	53.63"	41.06"	65.00"	21"	45.50"
D - 26"x26"x67"	1-L6	1-L4	65.25"	32"	53.63"	41.06"	82.38"	21"	48"

Transfer Carriage and Loading Cart Dimensions Cont'd

CHAMBER SIZE	CARRIAGE QTY	CART QTY	G	H1	H2	J[2]	K	L1	L2	L3
AA-16"x16"x26"	N/A	N/A								
A - 20"x20"x38"	1-L6	1-L4	13.50"	15"	16.38"	3"	18"	33"	36"	N/A
B - 26"x26"x39"	1-L6	1-L4	16.50"	19.50"	20.88"	4"	24"	34"	37"	N/A
C - 26"x26"x49"	1-L6	1-L4	16.50"	19.50"	20.88"	4"	24"	44"	47"	N/A
D - 26"x26"x67"	1-L6	1-L4	16.50"	19.50"	20.88"	4"	24"	62.50"	65"	30.50"

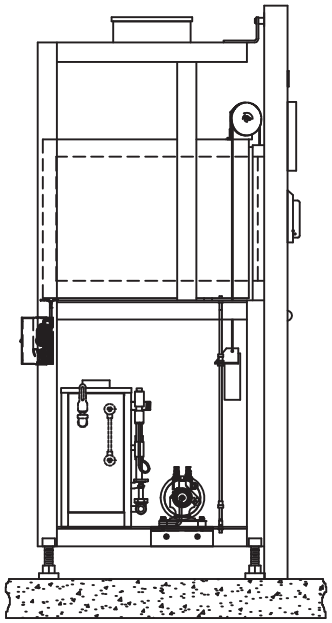
1. Typical Transfer Carriage and Loading Cart depicted. Contact PRIMUS for special design to accommodate your load requirements or existing equipment.
2. Standard shelf spacing, contact PRIMUS for special shelf placement.

TECHNICAL DATA SHEET

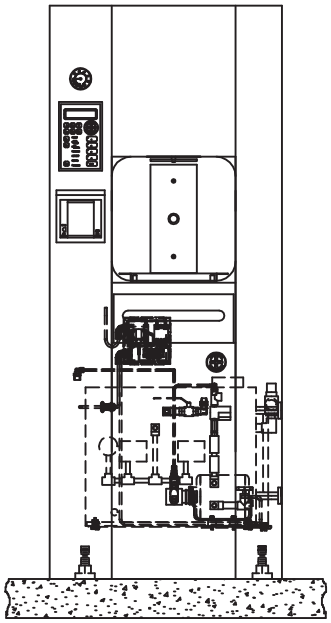
ELECTRIC BOILERS

MODEL		AA	A	B	C	D
Chamber Size (w x h x l) inches/millimeters		**16 x 16 x 26 406.4 x 406.4 x 660.4**	**20 x 20 x 38 508 x 508 x 965.2**	**26 x 26 x 39 660.4 x 660.4 x 990.6**	**26 x 26 x 49 660.4 x 660.4 x 1244.6**	**26 x 26 x 67 660.4 x 660.4 x 1701.8**
Bolier Size	kW/Hr.	24.0	24.0	36.0	48.0	72.0
Boiler Steam Output	lbs./Hr	73.0	73.0	108.0	145.0	217.0
Integral	Model	EB1-AA	EB1-A	EB1-B[1]	N/A	N/A
Stand Alone	Model	EB-AA	EB-A	EB-B	EB-C	EB-D
V.A.C. 208, 3 Ph	Amperes	67	67	100	134	200
V.A.C.240, 3 Ph	Amperes	58	58	87	116	174
V.A.C. 480, 3 Ph	Amperes	29	29	44	58	87
V.A.C. 110, 60 Hz[2]	Amperes	10	10	10	10	10

1. Single Door only
2. Controls Current



SIDE VIEW



FRONT VIEW

16” x 16” x 26” shown with integral boiler

Sterilizer Dimensions, Cubage & Weights

Model Sterilizer Size inches/millimeters	AA 16" x 16" x 26" 406.4 x 406.4 x 660.4	A 20" x 20" x 38" 508 x 508 x 965.2	B 26" x 26" x 39" 660.4 x 660.4 x 990.6	C 26" x 26" x 49" 660.4 x 660.4 x 1244.6	D 26" x 26" x 67" 660.4 x 660.4 x 1701.8
Overall Dimensions, of Frame	25 x 73 x 32-1/2 635 x 1854.2 x 825.5	28-3/4 x 73 x 45 730.25 x 1854.2 x 1143	35-1/2 x 79 x 50 901.7 x 2006.6 x 1270	35-1/2 x 79 x 60 901.7 x 2006.6 x 1524	35-1/2 x 79 x 78 901.7 x 2006.6 x 1981.2
Weight, Single Door	**CONTACT PRIMUS FOR WEIGHTS**				
Weight, Double Door					
Crated Weight (Additional)	200 lbs/ 91kg	200 lbs/ 91kg	200 lb/ 91kg	200 lbs/ 91kg	200 lbs/ 91kg
Crated Dimensions	43 x 81 x 47 1092.2 x 2057.4 x 1193.8	47 x 81 x 59 1193.8 x 2057.4 x 1498.6	61 x 84 x 61 1549.4 x 2133.6 x 1549.4	61 x 84 x 71 1549.4 x 2133.6 x 1803.4	61 x 84 x 89 1549.4 x 2133.6 x 2260.6
Crated Cube	95 cu ft/ 3m^3	130 cu ft/ 4 m^3	181 cu ft/ 5 m^3	211 cu ft/ 6 m^3	264 cu ft/ 8 m^3
Loading Equipment	N/A	124 lbs/ 56 kg	153 lbs/ 69 kg	175 lbs/ 79 kg	246 lbs/ 112 kg
Boiler	175 lbs/ 79 kg	200 lbs/ 91 kg	178 lbs/ 81kg	375 lbs/ 170 kg	450 lbs/ 204 kg

"PRIMUS Sterilizer...
...Quality by Design, Excellence by Choice"

TECHNICAL DATA SHEET

The VERSATILE 26"x 26" x 39"
Double the chamber capacity...
Triple the throughput...
And occupy only 1-1/2 square feet more of floor space

POPULAR 20"x 20" x 38"
One full-size closed instrument tray per shelf*

Holds 3 full-size closed instrument trays per shelf*
**SteriTite® Sealed Containers provided by Case Medical, Inc.*

QUALITY AND INTEGRITY FORM THE FOUNDATION OF PRIMUS STERILIZER COMPANY
OUR VISION FOR CONTINUAL IMPROVEMENT IS REALIZED THROUGH THE ESTABLISHMENT OF QUALITY OBJECTIVES ACHIEVED THROUGH TEAMWORK WITH A GOAL OF RETURNING SIGNIFICANT VALUE TO OUR CUSTOMERS.

PRIMUS Sterilizer Company, LLC • 117 South 25th Street • Omaha, NE 68131
Phone (402) 344-4200 • Fax (402) 344-4242 • info@primus-sterilizer.com • www.primus-sterilizer.com

Made In The USA

TECHNICAL DATA SHEET

PRIMUS Technical Data Worksheet

Complete the following by selecting or transferring the options, checked on preceding pages, required to meet your needs. Tear off and forward completed worksheet to PRIMUS Sales Department, fax 402-344-4200, or your local PRIMUS Representative. If you do not find an option or size listed to meet your requirement, please contact our Sales Department for additional information and assistance with a custom design to meet your specifications.

PRIMUS MODEL NUMBER		QUANTITY	
PROJECT NAME			
PROJECT ADDRESS			
COMPANY NAME		PHONE	
CONTACT NAME		FAX	
CONTACT EMAIL			
SPECIFICATION SECTION		ITEM NO.	
SHOWN ON DRAWING NO.		ROOM NO.	
PRIMUS QUOTE NO.			

GENERAL CONFIGURATIONS

	DA	Single Door
	DB	Double Door
	DG	Foot Operated Auto Door (Single Door)
	DE	Door(s) Manually Operated (Std)
	CD	Cabinet, 2 sides
	CCL	Cabinet, 1 Side Left
	CCR	Cabinet, 1 Side Right
	CA	Recessed, 1 Wall
	CB	Recessed, 2 Wall
	NPN	Left Side Service (Std)
	C30	Right Side Service Access & Control
	C31	Control Panel opposite side of Service
	CE	Top Panel
	CF	Rear Panel

STEAM SOURCE

	EB1	Boiler, 208/3ph
	EB2	Boiler, 240/3ph
	EB3	Boiler, 480/3ph
	EBO	Automatic boiler blow-down
	LWC	Low Water Cutoff, Manual Reset, Std

CLINICAL LABORATORY OPTIONS

	P14	Low Temperature Flowing Steam

CONTROLS & RELATED OPTIONS

	C6	PSS500 Control (Std)
	C10	Remote Mount Control Panel
	C11	Serial Data Output (RS232)
	R1	Impact Printer, Flush Mount 24 Column
	R7	Thermal Printer, 32 Column (Std)
	R4	Thermal Printer, Take-up Reel
	R4.1	Thermal Printer, Flush Mount 24 Column

GENERAL OPTIONS

	V3.1	Validation Port, 1.0" diameter
	V8	Seismic Restraint
	DF	Power Operated Door
	P10	Compressed Air to Gasket
	EAC	Air Compressor

UTILITY - RELATED OPTIONS

	P3	Boost Pump for Low House Water
	E1A	Stepping Transformer from 220V to 110V
	E1B	Stepping Transformer from 480V to 110V
	E1C	Stepping Transformer from 480/240 to 240/120V, 1 ph, 0.5KVA
	E2	UPS maintains control functionality for 30 minutes during power outage
	E3	GFI Receptacle

LOADING EQUIPMENT

	L1	Removable Bottom Shelf (Std)
	L2	Extendable Bottom Shelf
	L3	Additional Chamber Shelves
	L4	Loading Cart (N/A on 16"x16"x26")
	L5	Additional Cart Shelves (N/A on 16"x16"x26")
	L6	Transfer Carriage

VESSEL OPTION

	C4	Jacket Pressure Display, Analog

Std = Standard Component
N/A = Not Available

YOUR LOCAL PRIMUS REPRESENTATIVE:

FOR ADDITIONAL ASSISTANCE

To discuss your sterilization design needs or to request a Sterilizer Design Guide, please contact PRIMUS.

Manufacturer reserves the right to modify materials or specification without notice.

PRIMUS Sterilizer Company, LLC • 117 South 25th Street • Omaha, NE 68131
Phone (402) 344-4200 • Fax (402) 344-4242 • info@primus-sterilizer.com • www.primus-sterilizer.com

Made In The USA

Project No. 664-14-427
1st Floor Northwest (1NW) - Clinical Lab Phase lll
Department of Veterans Affairs, San Diego Healthcare System.

Part 1C – Mycology Equipment

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL PATHOLOGY
MYCOLOGY - MY01

SterilGARD® e3

BAKER

Environments For Science™

Meets NSF Standards

Underwriter Laboratories Listed

SterilGARD® e3
Class II Type A2 Biological Safety Cabinets

Energy-efficient and comfortable cabinets that help you make the world a better place.

- Industry's most durable and reliable cabinet means lower life-cycle costs and years of trouble-free operation.
- Multiple energy-saving features equal significant ongoing cost savings.
- Continuously safe work environment with self-adjusting motor technology.
- Comfortable user experience with low noise and heat generation.
- Enhanced productivity with ReadySAFE™ low-flow mode.
- Extended filter life means less user downtime and lower operational costs.
- Easier, faster maintenance.

Welcome to a New Experience in Biosafety Cabinets

SAFETY – always our top priority, safety is assured through a variety of features, including an audible and visual sash alarm system, power/processor fault alarm and an exclusive cable port to keep cables and tubing out of the way for proper viewscreen closure.

ENERGY EFFICIENCY – from the motor controller to the lighting, new patent-pending innovations provide significant annual cost savings while maintaining superior performance.

CONTAINMENT – maximum protection is achieved through six technologies working in concert: our exclusive momentum air curtain, high-velocity return air slots, aerodynamically designed airfoil, optimized downflow, and unique air bypass armrest.

COMFORT – with eight thoughtful features, from the viewscreen to the work environment and ergonomic design.

EASE OF USE – packed with convenient features and the largest, unobstructed, usable work area in the industry, there's plenty of room for lab equipment and less hassle when managing controls.

CLEANING – an exceptionally reliable membrane-sealed control panel, and a one-piece work surface/air intake grille featuring radiused, coved corners instead of seams, allows for easy and effective cleaning.

SERVICE AND CERTIFICATION – with an innovative electronic controller that provides diagnostic LEDs, detachable side panels, front-loading filters, and uniform downflow air, maintenance is quicker and easier.

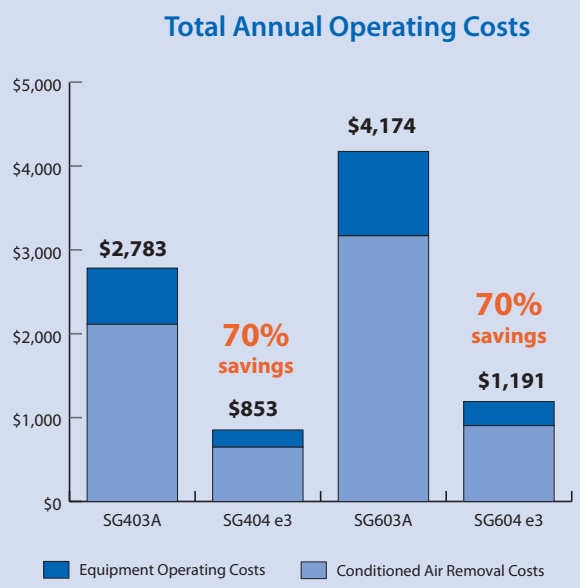
Class II, Type A2 Applications

The SterilGARD® e3 is designed for many applications involving agents of low and moderate risk. Appropriate applications include, but are not limited to, sterile product preparation and biological experimentation.

Not sure which biosafety cabinet is right for you?

Scan code to the right or visit http://hub.am/ZxbDic to download our free guide to Class II Biosafety Cabinets.

Industry-Leading Technologies Provide Superior Protection and Maximum Efficiency



The SterilGARD® e3 offers your lab the highest level of performance, user convenience and comfort, along with energy-efficiency. Our exclusive technologies, including StediFLOW™, ReadySAFE™, and UniPressure™ Preflow Plenum, work together to deliver unparalleled safety and performance, less cabinet downtime for cleaning and maintenance, and increased productivity.

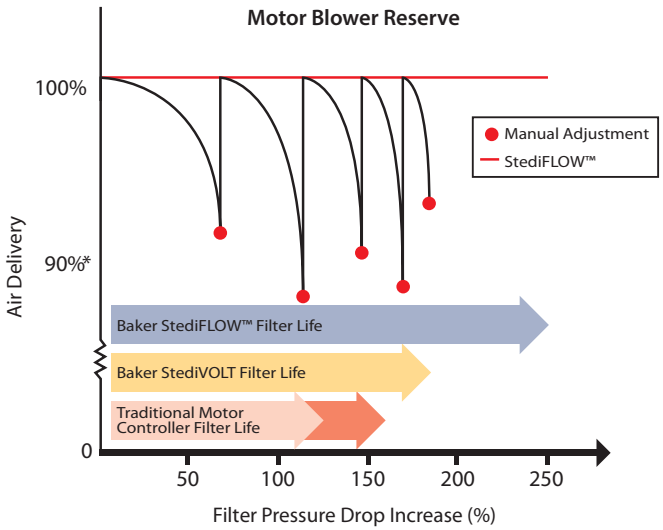
A significant reduction in energy consumption and heat rejection yields a 70% savings in annual operating costs.

NOTE:
Assumes U.S. Department of Energy national average cost of 9¢ per kilowatt-hour (http://www.eia.doe.gov/fuelelectric.html) and $4 / CFM / year. SterilGARD e3 data based on 8-hour Working Mode, 16-hour ReadySAFE™ Mode of a 115 volt unit.

StediFLOW™ VFD Motor Controller Automatically Achieves Optimum Performance

Baker's StediFLOW™ variable frequency drive (VFD) motor controller uses less energy, reduces heat output, and operates more quietly. VFD is state-of-the-art technology in HVAC systems for performance and energy savings. The SterilGARD® e3 cabinet can automatically handle an increase in pressure drop of more than 300% across the filter without reducing total air delivery more than 10%.*

- Maintains precise airflow - automatically compensates for normal power line variations, air disruptions, and filter loading.
- Provides constant air volume - reduces risk of performance degradation, which can compromise personnel and product protection.
- Extends filter life - minimizes filter replacement and decontamination costs.
- Uses less energy without sacrificing performance.
- Operates more quietly with less vibration.
- No manual speed control required.



*Manual adjustment may occur above or below 90%.

*Performance testing performed on an SG403 (115 V unit) in the Baker laboratory. Data available on request.

ReadySAFE™ Low Flow Mode Makes Your Job Easier and Reduces Energy Consumption

ReadySAFE™ mode – Unique bypass armrest allows cabinet to continue operation with closed viewscreen

Utilizing the exclusive ReadySAFE™ low-flow mode in the SterilGARD® e3 significantly reduces energy consumption. ReadySAFE™ is automatically engaged when the user closes the sash of the biosafety cabinet – the motor switches to a reduced flow mode and the light in the cabinet turns off. Upon opening the sash the motor switches to its normal operating speed and the cabinet light turns back on. Product protection and containment are maintained. This mode can be used during meetings, work breaks and overnight.

- Meets NSF 49 and ISO class 4 criteria in ReadySAFE™ mode.
- Consumes 50–75% less energy than when operating in the standard mode.
- Increases productivity by allowing user to have instantly safe working conditions upon opening the viewscreen and ongoing work can be left in the cabinet without fear of contamination.

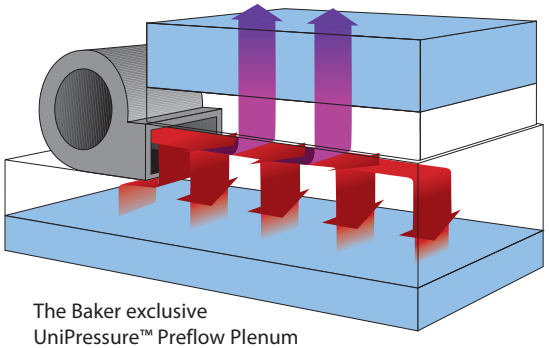
See the results for yourself!

Scan the code to the right or visit http://hub.am/10nB7SC to download the ReadySAFE™ white paper!

Innovative UniPressure™ Preflow Plenum

The SterilGARD® e3 incorporates Baker's exclusive UniPressure™ Preflow Plenum high-performance airflow system that saves energy and extends filter life by loading filters evenly.

- Creates negative pressure surrounding the positive-pressure plenum to ensure containment; any possible gasket leaks are contained under negative pressure and returned to the HEPA filters.
- Apportions and distributes air across, then through, the HEPA supply filter, improving downflow uniformity, reducing noise, and increasing reserve blower/motor capacity.
- Telescoping filter mount provides direct seal of HEPA filters to plenum and simplifies filter replacement.
- Closed-cell neoprene gasket forms airtight seal around filter periphery. Force is applied to full perimeter of filter rather than point force.
- Internal damper simplifies airflow balance and cabinet sealing for decontamination.

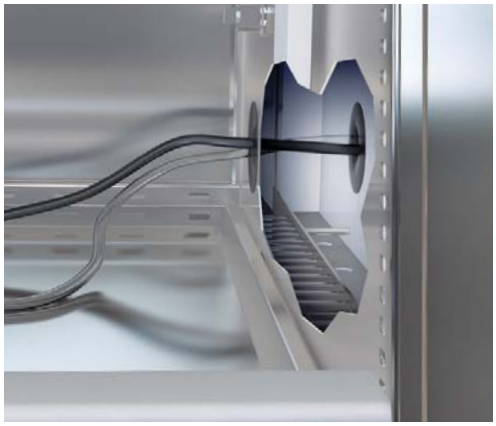


The Baker exclusive UniPressure™ Preflow Plenum provides quieter, more efficient operation.

A more efficient, less demanding, and quieter airflow system when combined with StediFLOW™.

Craftsmanship and Innovative, Versatile Design Ensures Quality and Performance

Baker cabinet designs represent many years of experience in fabrication and craftsmanship. The SterilGARD® e3 includes design features to improve safety, productivity, performance, and serviceability.



Double-wall construction captures and contains contaminated air under negative pressure.

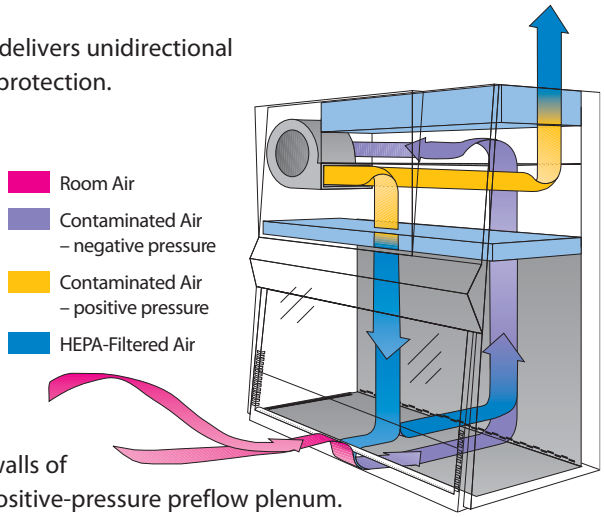
Negative-Pressure Double-Wall Plenums with Cable Ports Enhance Safety

The unique all-metal, double-wall design of the SterilGARD® e3 cabinet creates base, side, and back wall plenums that capture and contain contaminated air under negative pressure. This prevents contaminated air from escaping into the lab in event of damage to the cabinet walls.

Our NSF-approved cable ports are an industry exclusive. They can be located in the side walls of the cabinet, and provide a safe and ergonomic way of introducing cables or siphoning tubes into the work area without interfering with the viewscreen opening.

Balanced Airflow and Exhaust Ensure Uniformity

The SterilGARD® e3 cabinet features a unique airflow design that delivers unidirectional downflow air over the work area for maximum containment and protection.



- Filtered air descends from top to bottom of the work area in a unidirectional flow. Near the back of the work surface, the air current divides – a portion of the downflow air is pulled through the back wall grille and the remainder is pulled through the front grille.
- Simultaneously, room air is pulled through the front opening and into the front grille. It does not enter the work area.
- All air combines under the work surface and is pulled under negative pressure through the back and side double walls of the cabinet into the blower/motor, which blows it into the positive-pressure preflow plenum.
- From the positive-pressure plenum, approximately 30% of the air exits the system through the exhaust filter. The remaining 70% passes through the supply filter and re-enters the work area as particulate-free air.

Exclusive Designs Simplify Certification and Testing

Several SterilGARD® e3 design features help simplify certification and maintenance, reducing downtime and improving life-cycle costs.

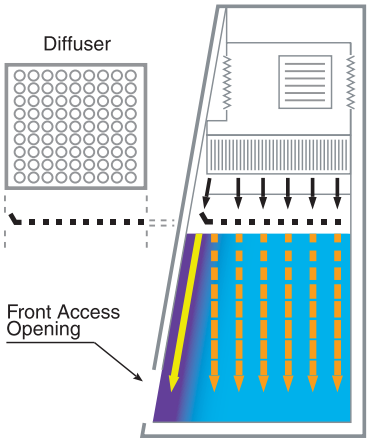
- Telescoping plenum assembly puts supply and exhaust HEPA filters within easy reach from the front of the cabinet, and allows filters to be clamped directly to plenum against closed-cell neoprene gasket.
- All components critical to cabinet operation, as well as exhaust and supply filters, are easily accessible from the front panel .
- Internal damper regulates balance between exhaust and supply to maintain proper air circulation ratios. Damper can be adjusted by certifier to compensate for changing resistance of the filters as they load with particles.

High-Velocity Return Air Slots Capture Unfiltered Air

Containment and cleanliness are achieved with precise control of airflow volumes and velocities. A unique feature in the Baker cabinet design, the high-velocity return air slots have been proven to maximize the biological safety cabinet's protective capabilities.

- Prevents contaminants from migrating up behind the viewscreen or around the side wall and escaping into operator's environment.
- Prevents room air from migrating down behind the viewscreen or around the side wall and contaminating work area.

High-velocity return air slots capture unfiltered air.



Momentum Air Curtain Increases Protection

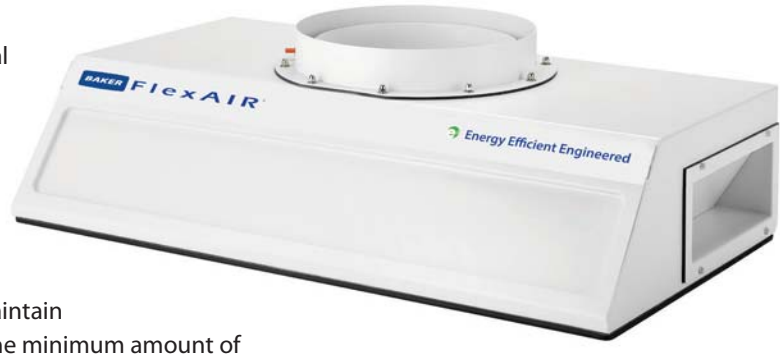
The SterilGARD® e3 cabinet employs a unique momentum air curtain that offers an added measure of containment and protection exclusive to the Baker design.

- Creates strong air barrier, or momentum air curtain, at front of cabinet, increasing protective capabilities for both products and personnel.
- Strategic position of a stainless steel diffuser creates faster airflow at front of work area. Airflow over center of work surface is gentle.
- Resulting air curtain combines with high-velocity return air slots, aerodynamically contoured front-opening surfaces, and optimum air intake velocity to minimize turbulence and prevent migration of airborne contaminants into or out of work area.

FlexAIR™ Exhaust Connection - Saves Energy and Provides Safer Biosafety Cabinet Performance

Baker's FlexAIR™ canopy exhaust connection combines the safety of a traditional canopy (thimble) exhaust connection with the lower exhaust flows of a traditional hard exhaust connection. Now, energy savings can be realized without sacrificing safety cabinet performance.

How It Works: Baker's new FlexAIR™ works by having dynamic closure panels. The front panel automatically opens in the event of exhaust system slowdown or failure, allowing the cabinet to maintain Class II, Type A2 biosafety cabinet performance. Only the minimum amount of air necessary to achieve cabinet exhaust containment is used, compared to traditional canopy exhaust connections that exhaust an additional 20% conditioned air from the room. FlexAIR™ reduces exhaust air volume for significant energy and cost savings.



FlexAIR™ system includes an alarm feature to let workers know when the house exhaust system has slowed down or stopped. This may be important if your work includes the use of volatile organic solvents, gases, or vapors (which are not captured by HEPA filters).

See the FlexAIR™ in action!

Scan the code to the right or go to http://hub.am/1llBnwq to watch the FlexAIR™ video!

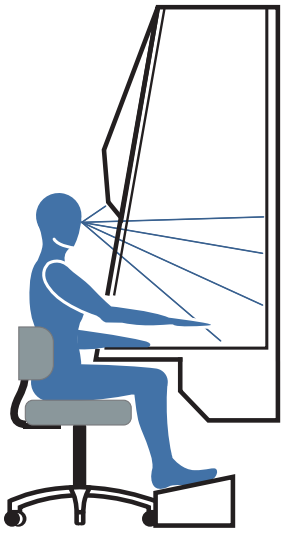
An Industry-Leading Approach to Ergonomics Creates a New Level of Productivity and User Comfort

The SterilGARD® e3 includes design features to improve safety, productivity, user-comfort, and performance throughout a range of tasks performed on a daily basis. Our cabinets are designed with the user in mind so that routine tasks can be done comfortably, efficiently, and with less fatigue.

Working Environment Offers Optimum Ease of Use and Comfort

A variety of convenient enhancements make the SterilGARD® e3 one of the most comfortable working environments.

- Unobstructed, usable work area is the largest in the industry and can accommodate more lab equipment.
- Reduced front grille depth moves work surface closer to front for better arm position, which helps improve posture.
- Low-profile, unitized drain pan beneath work surface allows more leg room.
- Air bypass padded armrest provides support and comfort.
- Eye-level control panel offers greater visibility and easier access.
- Non-glare work surface and cool-white fluorescent lamps reduce eyestrain.
- Optional stand with telescoping legs allows for an adjustable work surface height.
- Convenient built-in timers for lights and outlets come standard, minimizing risks and reducing energy consumption.
- Plumbing and drainage connections are strategically placed for convenience and proper air management.



Slanted Viewscreen Offers Comfort and Safety

The SterilGARD® e3 cabinet has a slanted sliding viewscreen that minimizes glare and makes the cabinet easier to use and more comfortable to work in.

- Allows operator more comfortable head and elbow position, reducing fatigue.
- Provides safe, highly visible and easily accessible work area for wide range of procedures.
- Rugged, easy-to-use counterweight allows easy opening and closing of viewscreen.
- Maximum opening simplifies equipment and instrument loading and unloading.
- Integrated alarm audibly and visually warns of improper viewscreen position.
- Viewscreen-level mute button silences alarm for 5 minutes when viewscreen is raised for cleaning, loading, or unloading.
- Laminated safety-glass construction.
- Stainless steel edge protector prevents chipping and cracking.

Craftsmanship Ensures Quality

Baker cabinet designs represent many years of experience in stainless steel fabrication and craftsmanship. Design considerations such as wide radius corners, aerodynamically shaped surfaces, and glare-reducing satin-finish interiors combine to improve comfort, simplify cleaning, and maintain proper containment.

- Work surface and walls are one-piece, corrosion-resistant, stainless steel with smooth radius corners for easy cleaning. White powder finish protects cold-rolled steel cabinet exterior.
- Work surface and supports are easily removed to facilitate cleaning drain pan.
- Stainless steel air diffuser/filter protector shields downflow filter in work area and provides uniform downflow and momentum air curtain.
- Protective grille under negative-pressure side walls prevents wipes and other paper materials from being inadvertently drawn into blower system, eliminating costly servicing, decontamination and downtime.
- Entire cabinet is airtight. Each component is welded, gasketed, or assembled with hermetically sealed joints. Each cabinet is bubble-tested under pressure – at the factory prior to shipping – to verify integrity of seals.

Options and Accessories

Most options, accessories, and modifications are factory installed and should be specified when ordering. Common options are listed below.

- Viewscreen sash opening: 10″ or 12″ (8″ is standard on all models)
- Stainless steel IV bar
- Additional petcocks
- Ultraviolet germicidal lamp with safety interlock and programmable timer
- FlexAIR™ canopy exhaust connection
- Reinforced work surface
- Seismic restraints (California OSHPD pre-approved per CBC 2013)
- Stands available with telescoping legs, casters, or electric hydraulic lift
- Remote-controlled petcocks
- Auxiliary wiring package (for monitoring blower switch, sash alarm, power loss alarm, and ReadySAFE™)
- ULPA filters
- Plastic storage bins
- Plumb to back
- Ergonomic adjustable footrest
- Available in 100 V (50/60Hz) and 220 V (50/60 Hz) models

For additional information, contact Baker or your local sales representative.

More Resources

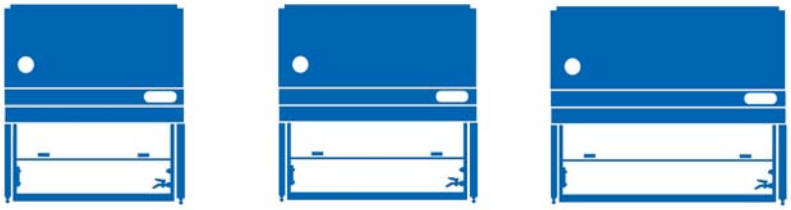
If you are interested in learning more about the SterilGARD® e3, a variety of resources are available at www.bakerco.com including:

- Purchasing, technical and master specifications
- Revit® files and standard details
- Videos, white papers and more!

Learn More!

Scan the code to the right or visit http://hub.am/1fX3oAC to access all the SterilGARD® e3 resources!

Technical Specifications
115 Volt



MODEL NUMBER	SG404	SG504	SG604
Nominal Size	4'	5'	6'
Interior Dimension (w x d x h)	46" x 24 9/16" x 27 7/16"	58" x 24 9/16" x 27 7/16"	70" x 24 9/16" x 27 7/16"
Usable Workspace (w x d)	44" x 19 5/8"	56" x 19 5/8"	68" x 19 5/8"
Exterior Dimensions (w x d x h)	53 3/4" x 30 11/16" x 61 3/4"	65 3/4" x 30 11/16" x 61 3/4"	77 3/4" x 30 11/16" x 61 3/4"
Cabinet Weight (lbs)	582	714	771
Shipping Weight (lbs)	785	940	1,020
Opening Max.	20"	20"	20"
Working Access Opening Height (8" standard)	8" / 10" / 12"	8" / 10" / 12"	8" / 10" / 12"
Operating Amperage†			
Normal Operating Mode (Amps)	3.6 / 4.0 / 4.2	4.1 / 4.7 / 5.2	5.6 / 6.8 / 6.4
ReadySAFE™ Mode (Amps)	1.8	1.9	2.1
Power Consumption††			
Normal Operating Mode (Watts)	414 / 460 / 483	472 / 541 / 598	644 / 782 / 736
ReadySAFE™ Mode (Watts)	207	219	242
Heat Generation‡			
Normal Operating Mode (BTU/hr)	1,413 / 1,570 / 1,649	1,612 / 1,845 / 2,042	2,199 / 2,670 / 2,512
ReadySAFE™ Mode (BTU/hr)	706	747	826
Electrical Service Requirements‡‡	115V AC, 20 A, 60 Hz	115V AC, 20 A, 60 Hz	115 V AC, 20 A, 60 Hz
Noise (dBa)	61 / 62 / 65	64 / 65 / 66	65 / 67 / 67

†Amperage for new cabinet with clean filters
††Power consumption at 120V
‡Calculated maximum based on operating amperage
‡‡ Also available in 100V (50/60 Hz) and 220V (50/60 Hz) configurations. CE compliant at 220V.

EXHAUST AND STATIC PRESSURE REQUIREMENTS (with FlexAIR® Canopy Exhaust Connection)	SG404	SG504	SG604
8" Working Access Opening Height			
Concurrent Balance Value (CFM min/max)	290 / 663	360 / 750	460 / 845
8" Exhaust Duct Diameter (" W.G. min/max)	-0.10 / -0.32	-0.15 / -0.62	-0.15 / -0.74
10" Exhaust Duct Diameter (" W.G. min/max)	-0.04 / -0.17	-0.05 / -0.16	-0.07 / -0.18
12" Exhaust Duct Diameter (" W.G. min/max)	-0.03 / -0.08	-0.04 / -0.12	-0.06 / -0.13
10" Working Access Opening Height			
Concurrent Balance Value (CFM min/max)	360 / 701	450 / 820	550 / 945
8" Exhaust Duct Diameter (" W.G. min/max)	-0.15 / -0.62	-0.18 / -0.60	-0.20 / -0.78
10" Exhaust Duct Diameter (" W.G. min/max)	-0.05 / -0.18	-0.09 / -0.35	-0.11 / -0.24
12" Exhaust Duct Diameter (" W.G. min/max)	-0.04 / -0.10	-0.05 / -0.16	-0.09 / -0.16
12" Working Access Opening Height			
Concurrent Balance Value (CFM min/max)	415 / 871	560 / 850	644 / 1,114
8" Exhaust Duct Diameter (" W.G. min/max)	-0.17 / -0.75	-0.22 / -0.74	-0.30 / -0.79
10" Exhaust Duct Diameter (" W.G. min/max)	-0.07 / -0.30	-0.09 / -0.24	-0.14 / -0.36
12" Exhaust Duct Diameter (" W.G. min/max)	-0.05 / -0.25	-0.07 / -0.17	-0.11 / -0.30

SterilGARD® e3 Class II, Type A2 Biological Safety Cabinet, Vertical Flow, 115 V, 60 Hz Model

PERFORMANCE

1. Manufacturer shall provide a certified copy of the personnel, product, and cross-contamination (biological) tests, equivalent to or more demanding than as specified in NSF International Standard 49, performed on the unit selected from the corresponding statistical sample. Tests may be witnessed by a representative of the purchaser.
2. Cabinet shall have momentum air curtain downflow velocity profile - a higher velocity of downflow behind the viewscreen relative to downflow velocity over the work surface - for added personnel and product protection.
3. High-velocity return air slots shall be located at each end of the front access opening. These slots help to prevent contaminated air from being drawn into the work area along the edges of the side wall and from escaping the work area to the ambient environment.
4. High-velocity return air slots shall also be located behind the viewscreen on the top edge for enhanced containment and product protection.
5. Cabinet shall be capable of automatically handling a 300% minimum increase in filter loading without reducing total air delivery by more than 10%. Test data to verify these capabilities shall be available upon request.
6. Intake velocity through the front access opening shall be minimum of 105 FPM. Standard opening for all models is 8”; 10" and 12" openings are also available for all models.
7. Each unit, before shipping, shall have a complete physical test to assure cabinet meets Class II requirements. A copy of this test will be provided with the operator’s manual shipped with the unit.
8. The unit shall have standard HEPA filters for a protection effectiveness of 99.99% on 0.3 micron size particles by DOP test. Filters shall be serviceable from front of cabinet.
9. The cabinet shall have a low flow mode (ReadySAFE™), which is active when the viewscreen is closed. This mode of operation shall reduce energy consumption by at least 50% and still meet the product and personnel protection testing requirements of NSF/ANSI 49. Particle testing while the cabinet is in this mode shall exceed the requirements for ISO Class 5 conditions for 0.3 micron particles. A connection shall be provided for indicating the ReadySAFE™ status to the facility building management system.

CONSTRUCTION

1. The vertical sliding viewscreen shall be slanted at an angle of 10° from vertical, capable of moving to a fully closed position during shutdown periods.
2. Viewscreen shall be constructed of ¼" UV-resistant laminated safety plate glass, with a maximum opening of 20" for equipment loading.
3. All biologically contaminated ducts, plenums, and work area side walls shall be permanent metal construction and maintained under negative pressure or enclosed within a negative-pressure zone.
4. Interior work area shall be 27 7/16" high.
5. Cabinet shall have Baker’s exclusive UniPressure™ Preflow Plenum, designed to provide more uniform airflow to the supply filter.
6. Supply and exhaust filters shall be front-loading.
7. A telescoping plenum assembly shall be provided to allow the filters to be directly clamped to the plenum against a closed-cell neoprene gasket. Plenum applies force to full perimeter of filters, rather than point force.
8. Unit shall have an audible alarm and a flashing LED to indicate when the sliding viewscreen is in an unsafe position. An alarm mute switch shall be provided on the front-mounted cabinet control panel to allow the operator to mute the alarm tone for brief adjustments. The alarm shall automatically reactivate after 5 minutes if the viewscreen remains in an unsafe position. Cabinet shall have capability of indicating a power loss at the panel with visual and audible alarms.
9. Cabinet exterior construction: seal panels and dress panels of 16-gauge cold-rolled steel, powder coated finish, painted PermaWhite.™
10. Cabinet interior (work area) construction: one-piece, 16-gauge, Type 304 stainless steel, with a smooth, 7/16" radius between rear and side walls, and easily cleanable, radiused corners on the work surface tray.
11. Work area side walls and rear wall to be one-piece construction. A straight back wall shall be provided to maximize work area and easily accommodate laboratory equipment.
12. Cabinet shall be double-wall construction with negative-pressure airflow between the walls, from drain pan to top, surrounding the sides and back of work area and cable port.
13. Bottom of access opening shall be aerodynamic airflow design directing airflow into the front grille to improve access opening containment capability and bypass armrest.
14. Cabinet shall have a unitized drain pan with 7/16" radius on all sides and a fully removable work surface and work surface supports to facilitate cleaning.
15. Cabinet shall be equipped with a stainless steel ball valve to allow safe and effective draining of spills.
16. Stainless steel air diffuser and filter protector provided in work area. Filter protector on top of cabinet is cold-rolled steel with powder coat finish.
17. Externally adjustable internal damper shall be provided to compensate for changing resistance of exhaust and supply filters during certification.
18. One petcock and one plugged penetration are provided as standard on the right side wall. Left side wall is prepunched for optional/additional plumbing connections.
19. All external plumbing connections to the petcocks shall be made through the bottom or back of the cabinet and not the sides, allowing zero clearance between the unit and the building walls or equipment to its right and left.
20. The unit has 3 optional stands available, including one with telescoping legs that allow the work surface height to be set from 26⅛" to 38⅝", a stand with casters, or a stand with an electric hydraulic lift.
21. Viewscreen guide design shall be a counterweighted pulley system allowing ease of movement up and down.

ELECTRICAL

1. Complete unit shall be listed as certified by Underwriters Laboratory (cULus) for electrical, fire, and personal safety.
2. Cabinet shall have a microprocessor-based control system with an easy-to-clean membrane control panel mounted on the front of the cabinet.
3. Cabinet shall have adjustable timers for fluorescent lights, outlets and optional UV lights. Timers operate in 15-minute intervals.
4. Work area shall be provided with two GFCI-protected duplex outlets, with drip-proof covers and shall be protected by a self-resetting circuit breaker.
5. A single 14' power cord and plug (NEMA 5-20P) shall be provided for electrical power source.
6. If equipped with optional UV light, includes a shutoff safety feature when the viewscreen is raised.
7. The unit shall have electronic ballasts for UV and fluorescent lighting to provide longer life and lower heat output.
8. Cabinet shall have an externally mounted fluorescent light fixture with electronic ballasts producing an average of 100 foot-candles illumination at work surface.

Caution

A Class II, Type A2 biological safety cabinet is suitable for work with agents in the absence of volatile toxic chemicals and volatile radionuclides per NSF 49.

With proper ventilation to the outside, a Class II, Type A2 biological safety cabinet is suitable for work with agents assigned to biosafety levels 1, 2 or 3, treated with minute quantities of volatile toxic chemicals and trace amounts of radionuclides required as an adjunct to microbiological studies, that will not interfere with the work when recirculated in the downflow air (as stated in NSF/ANSI #49).

Note: The adequacy of this containment cabinet for the user's personal safety, as with any containment cabinet, should be determined by an industrial hygienist or safety officer. Site preparation information, architectural drawings, detailed dimensions and purchase specifications are available.

72 Month Warranty

The Baker Company, Inc., expressly represents and warrants all goods (a) to be as specified (and described) in The Baker Company catalogs and literature, and (b) to be free under normal use, service, and testing (all as described in The Baker Company catalogs and literature) from defects in material and workmanship for a period of seventy-two months from the invoice date. Seventy-two month warranty is only available in the United States; international warranty is twelve months.

The exclusive remedy for any breach or violation of this warranty is as follows: The Baker Company, Inc., will F.O.B. Sanford, Maine, furnish without charge repairs to or replacement of the parts or equipment that proved defective in material or workmanship. No claim may be made for any incidental or consequential damages.

THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE UNLESS OTHERWISE AGREED IN WRITING SIGNED BY THE BAKER COMPANY. (THE BAKER COMPANY SHALL NOT BE RESPONSIBLE FOR ANY IMPROPER USE, INSTALLATION, SERVICE, OR TESTING OF THE GOODS.)

PROUDLY MADE IN THE U.S.A.

BAKER

Environments For Science™

P. O. Drawer E, Sanford, ME 04073 • (207) 324-8773 • (800) 992-2537 • Fax: (207) 324-3869 • www.bakerco.com

SG-115v-specrevB-Apr2014

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL
PATHOLOGY
MYCOLOGY - MY03

Thermo Scientific Forma® Reach-In CO_2 Incubator

Designed for growing needs

Uniform Performance

High Capacity Reach-In that Grows with Your Needs

Our full-featured Thermo Scientific Forma Reach-In CO_2 Incubator is the reliable reach-in that will meet your application needs today and in the future – without requiring expensive add-on options. This durable unit is ideal for culturing large volumes of patient samples for bacterial growth, performing short-term growth studies, and working with large volume products. The reach-in provides elevated RH to prevent product desiccation in medium-term cultures, and maintains temperature uniformity even when equipment is installed in the chamber (e.g., cell rollers, rockers, shakers, spinners, or stirrers).

Tight temperature uniformity contributes to an ideal culturing environment, even when the chamber is completely full.

Valuable features are included, rather than optional, ensuring cost-effectiveness and ultimate flexibility for a wide range of applications.

This carefully designed reach-in is easy to configure and use. It includes powerful, intuitive Enviro-Scan® controls that are common to other Thermo Scientific Forma products, a selectable humidity range, and accessories for specialized needs, including shelf systems to support two shakers or extra-heavy product loads.

The Thermo Scientific Forma Reach-In CO_2 Incubator – it's built to last; it's designed to accommodate your growing needs.

HIGH CAPACITY MODEL 3950 (3951)

- **Roomy 29.0 cu. ft. interior volume**
- **Five adjustable shelves included**
- **Swivel, locking casters for mobility**
- **All stainless steel interior for durability**
- **Access ports and interior outlet for convenience**

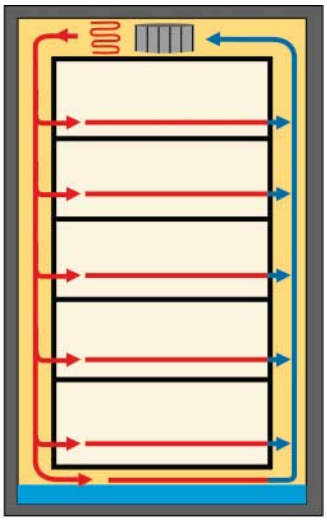
Tight Temperature Uniformity for Ideal Culturing

Temperature uniformity contributes to an ideal culturing environment. You can be confident of optimum temperature uniformity and recovery when you put this high capacity chamber to the test with large product loads and low output, heat-generating equipment.

Advantages of a Directed Horizontal Laminar Airflow System

Our reach-in incubator's directed airflow system promotes an ideal growth environment. The proven design includes a positive pressure feed plenum on the left side of the chamber and a negative pressure return plenum on the right. This combination directs air across the surface of each solid shelf.

Even when filled with samples or equipment, each shelf receives a consistent flow of conditioned air for optimum temperature uniformity and recovery. By design, the feed plenum cannot be blocked by the chamber's contents.



Our directed airflow design

As opposed to our horizontal airflow system, top-to-bottom (non-directed) airflow systems use a top-mounted fan to push air down through wire shelves. Temperature uniformity and recovery can deteriorate quickly when shelves are filled because air movement is blocked. That temperature variation, alone or when combined with frequent door openings, may compromise growth conditions or make process validation difficult.

The Thermo Scientific Forma Reach-In CO_2 Incubator's directed airflow minimizes the risk of product desiccation and loss, and wasted time and money due to poor temperature uniformity and recovery.

Valuable Features Included for Cost-Effectiveness and Flexibility – Right from the Start!

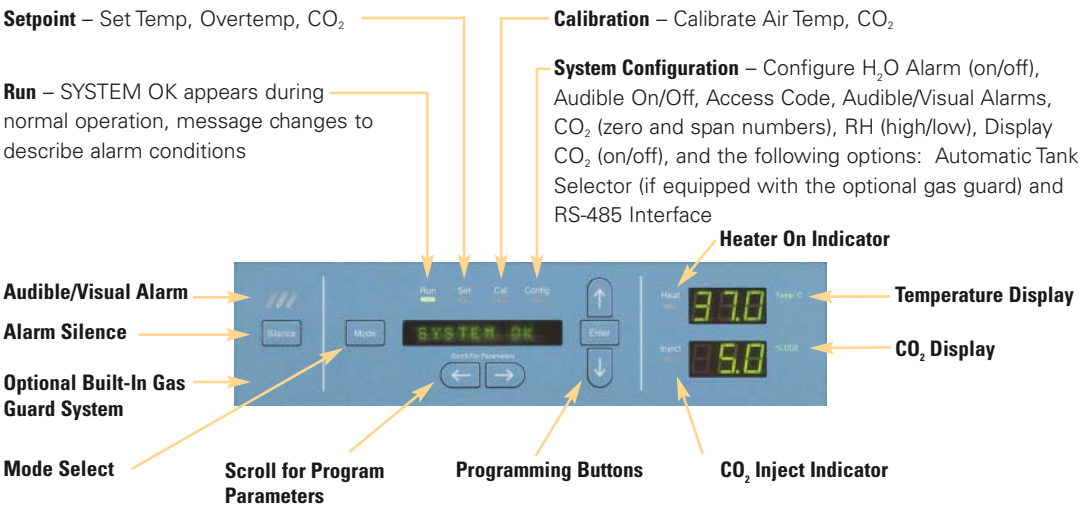
Our rugged 29.0 cu. ft. (821.2 liters) Thermo Scientific Forma Reach-In CO_2 Incubator is loaded with valuable features that will serve you from day one. You don't need to purchase a range of expensive options to create a chamber that truly meets your needs. Primary features for ultimate flexibility are already built-in.

- Swivel, locking casters ensure easy mobility for installation and cleaning. Leveling feet provide stability for added safety in the lab.
- Heated triple-pane glass door minimizes condensation and permits a clear view of your product.
- Standard remote alarm contacts and available data outputs allow connection to an in-house monitor/alarm system to track chamber conditions, helping you meet internal and regulatory documentation requirements.
- Two thru-wall access ports (one on right and left sidewalls) make it possible to add probes, sensors, power cords, etc. without altering the cabinet.
- Interior and exterior accessory receptacles provide a convenient power source.
  - Interior GFCI duplex receptacle on the 115V Model 3950 (single European 230V CEE 7 on Model 3951), located in the upper right corner of the rear wall, permits the use of shakers, cell rollers, and other equipment inside the chamber, eliminating the inconvenience of an extra external power strip.
  - Exterior receptacle, located on the upper right side of the control panel, is available for connecting an optional recorder or other equipment.
- Heavy-duty, solid stainless steel shelves are easy to clean, saving time and effort; more corrosion resistant than coated wire shelves for long life; and adjustable on 2.0" (5.1cm) centers for convenience.
- Additional reinforced shelving systems are available for increasing shelf load and maximizing stability when used with heavy product load or equipment, such as our Thermo Scientific Forma Orbital Shakers.
- Stainless steel interior is more durable and corrosion resistant than plastic or painted metal, ensuring a long life and minimizing equipment costs.

Easy to Configure and Use

Quality construction. Reliable performance. Intuitive controls. Our reach-in CO_2 incubator is designed for ease of use and long life.

- Three-setting RH system – off, medium, high – is easy to use, reliable, and can be customized for your application.
- Three water fill options – automatic, semi-automatic, and ergonomic manual – accommodate your facility's setup and provide the convenience of a long time period between refills.
- Enviro-Scan Microprocessor Message Center (shown below) allows you to control all parameters without complicated programming.



Cell Roll System

The optional cell roll system allows extensive production of monolayer cell cultures in standard roller culture vessels. Oxygenation and exposure of the cells to the media growth area are improved. Culture yields are increased by the uniform temperature control and cell roll system's continuous, gentle rotation.

The reach-in accommodates a cell roller up to 7 decks high with 5 positions per deck for a maximum total of 35 positions, or bottles.

Achieving maximum capacity requires a Model 4862 (4868) three tier cell roller base (15 positions), four add-on tiers (20 positions), and a reinforced floor/ramp.

All position drive is standard. Adjustable speed control provides precise speeds of 0.125 to 6.25 RPM with ±1.0% accuracy, based on 110mm bottles.

Stock No.	Description
4862	Three Tier Cell Roller Base (15 positions), 120V, 50/60 Hz, 29.8"W x 27.8"H x 24.4"F-B (75.7cm x 70.6cm x 62.0cm)
4868	Same as Model 4862 but 230V, 50/60 Hz
190049	Add-On Tier (5 positions), 29.8"W x 7.1"H x 24.4"F-B (75.7cm x 18.0cm x 62.0cm), customer installed
190777	Reinforced Floor with Removable Ramp, ramp extends 23.0" (58.4cm), factory installed
500182	Same as No. 190777 but customer installed
228077	Rotation Alarm System, includes annunciator jack, factory installed
228078	Battery Back-Up, provides 24 hours of power if a power failure occurs, factory installed
475560	110mm x 285mm Glass Bottles (4 per case)

(Additional accessories are listed on page 6.)

Specifications

Temperature
Control . . . . . ±0.1°C
Range . . . . . 5°C above ambient to 60°C (140F)
Uniformity . . . . . ±0.3°C @ 37°C (98.6F)
Tracking Alarm . . . . . User-programmable low

Overtemperature
Sensor . . . . . Precision thermistor
Setability . . . . . 0.1°C
Function . . . . . User-programmable, action (shuts off heat), and indicator
Controller . . . . . Independent analog electronic

Temperature Safety
Sensor . . . . . Independent thermostat
Controller . . . . . Independent analog electronic

CO_2
Control . . . . . Better than ±0.1%
Range 0-20%
Inlet Pressure . . . . . 15 PSIG (1.0 bar)
Sensor . . . . . T/C (thermal conductivity)
Readability & Setability . 0.1%
Tracking Alarm . . . . . User-programmable high/low

Humidity
Input Water Quality . . . . 50K to 1Meg Ohm resistance
Selectable Ranges. . . . . Off, Medium >80%, High >90%
Humidity Reservoir . . . . 4 gallons (15.1 liters)
Water Level Alarm. . . . . User-programmable on/off

Fittings
Access Port . . . . . 2.4" (6.1cm) I.D., one on each side, with stopper
CO_2 Inlet . . . . . 1/4" hose (barbed)
Water Inlet. . . . . 1/4" MPT
Condensate Drain . . . . . 3/8" FPT
Overflow Drain . . . . . 3/8" MPT

Unit Heat Load
115V/230V . . . . . 510 BTUH (150 Watts), 129 kcal per hour

Shelves
Dimensions . . . . . 30.6" x 25.8" (77.7cm x 65.5cm)
Construction . . . . . Type 304, 2B finish, solid stainless steel
Surface Area . . . . . 5.4 sq. ft. (0.5 sq. m)
Max. per Chamber . . . . 145.8 sq. ft. (13.5 sq. m)
Standard, Maximum . . . 5, 27

Construction
Interior Volume . . . . . 29.0 cu. ft. (821.2 liters)
Interior . . . . . Type 304, 2B finish, stainless steel
Exterior . . . . . Cold-rolled steel, powder coated
Insulation . . . . . 2.0" (5.1cm) fiberglass
Exterior Door . . . . . Heated, triple pane, tempered glass
Outer Door Gasket . . . . Molded vinyl

Electrical
3950 . . . . . 115V, 50/60 Hz, 10.0 FLA (Operating range 90-125V includes voltage fluctuations)
3951 . . . . . 230V, 50/60 Hz, 6.0 FLA (Operating range 180-250V includes voltage fluctuations)
Circuit Breaker/ Power Switch . . . . . 3950: 15 Amps/2 Pole 3951: 8 Amps/2 Pole
Exterior Convenience Receptacle . . 75 Watts maximum (matches cabinet voltage)
Interior Convenience Receptacle . . . 230 Watts maximum (matches cabinet voltage)
Plug . . . . . 115V: NEMA 5-15P Plug 230V: CEE 7/7 Plug
Alarm Contacts . . . . . Power interruption, deviation of temp and CO_2, customer connections through jack on back of unit
Data Outputs (opt.) . . . . RS-485, 0-1V, 0-5V, 4-20 milliamp (select one)

Dimensions
Exterior . . . . . 38.0"W x 80.0"H x 33.0"F-B (96.5cm x 203.2cm x 83.8cm)
Interior . . . . . 31.0"W x 60.0"H x 27.0"F-B (78.7cm x 152.4cm x 68.6cm)

Weight
Net . . . . . 500 lbs. (226.8 kg)
Shipping (Motor) . . . . . 660 lbs. (299.4 kg)

Specifications are based on nominal voltages of 115V or 230V in ambients of 22°C to 25°C (71.6F to 77F). Both units are UL Listed to United States and Canadian requirements and bear the CE Mark.

Accessories and Warranty

Accessories are customer installed unless indicated otherwise. (Refer to page 4 for a description of the cell roll system.)

Carboy Kit

Carboy Kit (No. 191596) makes it easy to semi-automatically fill the reach-in. The carboy, which can be mounted on either side of the reach-in, can be carried to the water source or filled while mounted.

Kit includes an autoclavable 2 gallon (7.8 liters) carboy, valve, adapter, hose, and mounting bracket.

Shelves and Reinforced Shelf Systems

Stock No.	Description
224139	Solid Stainless Steel Shelf with Channels
224155	Perforated Stainless Steel Shelf with Channels
	Solid Stainless Steel Reinforced Shelf Systems –
224161	Adjustable Reinforced Shelf with Channels, increases shelf load to 150 lbs. (68.0 kg) maximum with shelf fully inserted and stationary (maximum 2 per unit, not for shakers), adjustable on 2.0" (5.1cm) centers, can be removed for cleaning
1900005	Two Fixed Reinforced Shelves, provide extra support for lab equipment (e.g., 2 Forma Orbital Shakers, 250 RPM maximum each), factory installed 1.0" and 30.0" (2.5cm and 76.2cm) above the floor, rubber isolators instead of casters are installed on the reach-in for added stability

Data Outputs (select one), factory installed

Stock No.	Description
190523	RS-485 interface
190512	4-20 milliamp
190543	0-5V analog
190544	0-1V analog

Additional Accessories

Stock No.	Description
190239	Lexan® Inner Door Kit, factory installed
190514	Door Lock, factory installed
190591	Door Glass Cover, factory installed
	6", 7 Day Circular Chart Recorders –
201155	Single Pen, 115V
201156	Single Pen, 220V
201159	Dual Pen, 115V, 1 probe, temp/RH
201160	Dual Pen, 220V, 1 probe, temp/RH
190164	Additional Thru-Wall Access Port, 2.4" (6.1cm) I.D., factory installed
1900000	Built-In CO_2 Gas Guard, factory installed
6003950	IQ/OQ, MS Windows®-compatible document disk for process customization and detailed checklists to qualify unit setup and operation

Warranty

We confidently back our Forma Reach-In CO_2 Incubator with a full one year parts and labor warranty.

Thermo SCIENTIFIC

North America: USA/Canada +1 866 984 3766 www.thermo.com/incubators
Europe: Austria +43 1 801 40 0, Belgium +32 2 482 30 30, Finland +358 9 329 100, France +33 2 2803 2000, Germany national toll free 08001-536 376, Germany international +49 6184 90 6940, Italy +39 02 95059 1, Netherlands +31 76 571 4440, Russia/CIS +7 095 225 11 15, Spain/Portugal +34 93 223 09 18, Switzerland +41 44 454 12 12, UK/Ireland +44 870 609 9203
Asia: China +86 21 6865 4588 or +86 10 5850 3588, India +91 22 5542 9494, Japan +81 45 453 9220, Other Asian countries +852 2885 4613
Countries not listed: +49 6184 90 6940 or +33 2 2803 2000

BRO-CECO2-FRIN-0407

Project No. 664-14-427
1st Floor Northwest (1NW) - Clinical Lab Phase lll
Department of Veterans Affairs, San Diego Healthcare System.

Part 2 – Flowcytometry Equipment

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL
PATHOLOGY
FLOW CYTOMETRY FC01, FC03, FC10

BD FACSCanto II Flow Cytometer

Technical Specifications

Built on more than 25 years of BD experience and leadership in flow cytometry and multicolor analysis, the BD FACSCanto™ II system is an easy-to-use benchtop analyzer that delivers proven performance, accuracy, and high-quality results. The BD FACSCanto II can be configured with two or three lasers to detect up to eight colors. It features many innovations, including a true fixed alignment flow cell to minimize startup time and improve reproducibility. The optical system maximizes signal detection and increases sensitivity and resolution for each color in a multicolor assay. These and other capabilities make the BD FACSCanto II ideal for today's busy clinical lab, providing a high degree of automation and quality control. With optimal reproducibility, the BD FACSCanto II system reduces hands-on technician time and costs associated with repeat testing.

Optics

Lasers
Air-cooled:
488-nm solid state, 20-mW laser output

633-nm HeNe, 17-mW laser output

Laser Configuration
Spatially separated beams with 9 x 65-µm elliptical spots

Optical Alignment Procedure
Fixed, no operator alignment required

Flow Cell
180 x 430-µm rectangular quartz flow cell

Collection Optics
Optical-gel coupled 1.2 NA lens

FSC Resolution
1.0 µm

SSC Resolution
0.5 µm

Fluorescence Detector Design
Reflective optics with single transmission filter in front of each PMT

FSC Detector
Photodiode with 488/10 BP

SSC Detector
PMT with 488/10 BP

Fluorescence Detectors
6 PMTs in 4-2 standard configuration

Blue Laser Dyes
FITC, PE, PerCP or PerCP-Cy™5.5, PE-Cy™7 (525, 575, 678 or 695, 785 nm)

Red Laser Dyes
APC, APC-Cy7 (660, 785 nm)

Detector Bands
Blue Laser:
530/30; 585/42; >670; 780/60 nm

Red Laser:
660/20; 780/60 nm

Fluorescence Threshold Sensitivities
FITC <100 MESF; PE <50 MESF

Sensitivity Measurement Using BD FACS 7-Color Setup Beads
Sensitivity determined with the setup beads measures the ability to resolve a dimly stained population from unstained cells. This sensitivity measure takes into account both the separation of the populations and the broadness of the negative population. Different fluorochromes give different separation of the stained and unstained populations; this is also taken into account in the sensitivity measurement. The higher the reported number, the higher the resolution.

Minimum values:
FITC >15; PE >80; PerCP >9; PerCP-Cy5.5 >25; PE-Cy7 >120; APC >40; APC-Cy7 >16

Filter Change Procedure
Keyed filters, no tools required

Fluidics

General Operation
Integrated fluidics cart and compressor with onboard housekeeping solutions for automated startup, shutdown, and cleaning cycles

Sheath Consumption
1.10 L/h normal operation; <1 mL/h standby

Housekeeping Solution Capacities
BD FACSFlow™ sheath solution 20 L

BD™ FACSClean solution 5 L

BD FACS™ shutdown solution 5 L

Waste tank 10 L

Carryover
≤0.1%

Sample Injection
Direct into flow cell

Max Particle Size
50 µm

Sample Flow Rate, Min
10 µL/min

Sample Flow Rate, Max
120 µL/min

Sample Acquisition Rate
10,000 events/second, 6 compensated fluorescence parameters and 2 scatter parameters

Sample Dead Volume
30 µL (BD Falcon™ tubes 12 x 75-mm)

System Cleaning
Daily: Automated startup and shutdown procedures

Monthly: Run long clean

Data Management System

Parameters
Area (A), Width (W), Height (H) for all channels with up to 2 ratios, and Time (T)

Signal Processing
18-bit dynamic range with IEEE 32-bit floating-point resolution

Threshold
Single parameter (any channel) or logical combinations of multiple parameters (any or all channels)

Compensation
Full inter-beam matrix, during or post acquisition

Maximum Logical Gate Regions
Limited only by system memory (2 GB RAM)

CPU/Monitors
HP Xw4600, with either 19" or 24" flat screen monitors

Software
BD FACSDiva™ v6.1.3,
BD FACSCanto™ clinical v2.2 or 2.4

Operating System
Microsoft® Windows® XP Pro

Cytometer Options

8-Color Option with 3 Lasers*

Lasers
Air-cooled:
405-nm solid state diode, 30-mW fiber power output

488-nm solid state, 20-mW laser output

633-nm HeNe, 17-mW laser output

Fluorescence Detectors
8 PMTs in 4-2-2 configuration

Laser Dyes
Violet:
Pacific Blue™, AmCyan (455, 488 nm)

Blue:
FITC, PE, PerCP or PerCP-Cy5.5, PE-Cy7 (525, 575, 678 or 695, 785 nm)

Red:
APC, APC-Cy7 (660, 785 nm)

Detector Bands
Violet:
450/50; 502 to 525 nm

Blue:
530/30; 585/42; >670; 780/60 nm

Red:
660/20; 780/60 nm

8-Color Option with 2 Lasers*

Lasers
Air-cooled:
488-nm solid state, 20-mW output

633-nm HeNe, 17-mW output

Fluorescence Detectors
8 PMTs in 5-3 configuration

Laser Dyes
Blue:
FITC, PE, PE-Texas Red®, PerCP or PerCP-Cy5.5, PE-Cy7 (525, 575, 615, 678 or 695, 785 nm)

Red:
APC, Alexa Fluor® 700, APC-Cy7 (660, 720, 785 nm)

Detector Bands
Blue:
530/30; 585/42; 616/23; >670; 780/60 nm

Red:
660/20; 712/21; 780/60 nm

Sample Input with BD FACS™ Loader Option

Loading
40-tube carousel

Sample/test ID
Indexed carousel, with carousel ID barcode reader

Worklist importable from BD FACS™ Sample Prep Assistant (SPA) III

Throughput
56 min/carousel with BD™ Multi-check high controls,

66 min/carousel with BD Multi-check low controls using BD Multitest™ 6-color TBNK application

Miscellaneous
Multiple clinical applications can be run on the same Loader carousel.

Sample Input with BD High Throughput Sampler Option**

Loading
96- and 384-well microtiter plates

Throughput
<15 min/96-well plate in high-throughput mode with 2-second acquisition

Carryover
≤1%

Barcode Reader with Stand

Use with
BD FACSCanto clinical software

2D Reader
Streamlined input of BD FACS™ 7-color setup bead target values, input of patient information

* 7 and 8 color applications using violet laser are for Research Use Only

** For Research Use Only

Specifications

Installation Requirements

Size (D x W x H)

Cytometer:
24 x 36 x 25 in. (61 x 91 x 64 cm)

Fluidics cart:
24 x 31 x 25 in. (61 x 79 x 64 cm)

The cytometer depth increases to 30 in. (76 cm) with the BD FACS Loader and HTS option installed

Weight

Cytometer:
320 lb (145 kg)

Fluidics cart:
112 lb (51 kg)

Power

100/115/230 VAC, 50–60Hz

Operating Environment

16–30°C, 20–80% noncondensing relative humidity

Heat Dissipation with BD FACS Loader Installed

1,843 BTU/h

23-10918-00

BD Biosciences
2350 Qume Drive
San Jose, CA 95131
answers@bd.com
bdbiosciences.com

PURCHASE SPECIFICATIONS FOR NUAIRE LABGARD ES ENERGY SAVER NU-430 (Series 60) BIOLOGICAL SAFETY CABINET

The intent herein is to provide a concise statement of requirements for a quality Class II, Type B2 Laminar Airflow Biological Safety Cabinet which may be used to augment your purchase request/order.

The LABGARD ES NU-430 meets the performance requirements of the NSF/ANSI 49. Your confidence is well placed in a Biological Safety Cabinet that meets NSF Standard.

NuAire sales representatives will be pleased to explain the importance of the performance and control affected by each of the following requirements. The NuAire LABGARD ES NU-430 meets all of the requirements in the following SPECIFICATION.

1. Dimensions Inches (mm)

Overall Dimensions	**NU-430-300**	**NU-430-400**	**NU-430-600**
Width (W)	37 5/8 (956)	53 5/8 (1362)	77 5/8 (1972)
Depth (D) (Incl. Control Center)	32 7/8 (835)	32 7/8 (835)	32 7/8 (835)
Height (H) (Incl. Exh Filter Fastener)	61 (1549)	61 (1549) 89	61 (1549)
Basestand, 30" W.S.	89 1/2 (2273)	1/2 (2273) 95	89 1/2 (2273)
Basestand, 36" W.S.	95 1/2 (2426)	1/2 (2426)	95 1/2 (2426)
Interior Dimensions			
Width (W)	30 3/8 (772)	46 3/8 (1178)	70 3/8 (1788)
Depth (D)	23 1/2 (597)	23 1/2 (597)	23 1/2 (597)
Height (H)	25 1/2 (648)	25 1/2 (648)	25 1/2 (648)

2. Cabinet shall provide airflows & biological safety performance as specified.

**a. Cabinet shall provide biological containment protection for both operator and product proven by an actual test, (e.g. test conducted by NSF) and routinely validated by NuAire.

b. Cabinet shall be single pass flow through design in which all HEPA filtered work zone and work access inflow air, is drawn through the cabinet's internal exhaust HEPA filter and exhaust duct work to a remotely located roof exhaust blower.

*c. Cabinet shall be constructed from 16GA, Type 304 stainless steel forming an all welded, monolith, sealed structure.

d. Cabinet shall be easily fumigated employing an established procedure such as that recommended by NIH or NSF.

e. Supply HEPA filter shall be of full cabinet work zone width and depth; work zone below supply HEPA shall be of fixed cross-sectional area (sloping back wall or viewing window is unacceptable).

*f. Supply HEPA filter shall be protected by a perforated metal diffuser covering the entire top of the work zone.

*g. Air velocity from the supply filter shall average 55 to 65 FPM (.28 to .33 m/s) with no single point outside the 20% of average range measured in a horizontal plane defined by 4 inches (102mm) above the bottom edge of window.

*h. Work access opening shall be 8 inches (203mm) high. Average inflow velocity shall nominally be 105 LFPM (.53 m/s).

*3. The cabinet shall be ergonomically designed for maximum user comfort and adjustability to meet the requirements of the American Disabilities Act (ADA.)

- Standard non-metalic armrest/airfoil incorporating a large 1-1/2 inch (38mm) forearm support area with 1/2 inch (12mm) recessed front grill, designed for arm rest comfort while maintaining containment performance.
- Maximum visibility into cabinet workzone shall be at least 20-1/2 inches (521mm) from front access airfoil to exterior light housing.
- Cabinet shall have a centrally located instrument panel within the control center that is easily serviced with quick disconnects.
- Cabinet shall have the capability of incorporating a user-adjustable basestand or base storage cabinet as an option.
- The cabinet shall have a smooth operating sliding window from 1.125 inches (29mm) closed to full opening at 18-1/2 inches (470mm).
- Cabinet shall have a large worktray (17.250 inch (438mm) depth) (17.375 inch (441mm) depth, NU-430-300) removable with coved corners for easy cleaning.

*4. The cabinet shall have all positive pressure plenums surrounded by a vacuum relative to the room (the LABGARD ES™ employs the HEPEX™ Zero Leak Airflow System).

5. Electrical power shall be supplied with a 12 foot (2.5m), 3-wire cord. Electrical supply should be 115 VAC, 60 Hz (current rating varies per cabinet size, reference Electrical Requirements Page 5) protected with thermal circuit breaker from distribution panel.

*6. The cabinet shall use a DC ECM Motor with optimally determined forward-curved fan for each model size/width to maximize both energy efficiency and filter loading capacity.

7. The cabinet shall have three (115VAC) internal electrical circuits; one each for blower and lights and one for the duplex outlets (115VAC). Each circuit shall be protected with a fuse located in the control center on the electronic module.

8. The cabinet shall be listed by Underwriters Laboratories to meet the requirements of both the U.S. and Canada for electrical/mechanical integrity.

*9. Cabinet shall contain a control system which is a self contained electronic module that will perform the following functions:

- Easy use interface via ***TOUCHLINK*** color LCD.
- Control blower DC ECM Motor via solid-state DC Motor Controller that provides automatic compensation (constant volume control) for both filter loading and line voltage variances.
- Intelliflow™ - Fast, accurate, reliable dual thermister, airflow sensors and digital differential velocity pressure flow grid powered by TSI to control and monitor cabinet airflows to setpoints.
- Control lights via solid state switch.
- Control outlets via solid state switch.
- Display date/time w/battery backup.
- Display blower and optional UV light run timers.
- Display alarm setpoints high/low for error conditions (downflow/inflow).
- Display complete calibration, option menu and diagnostic functions.

*10. The cabinet shall contain an exhaust interlock system that prevents operation of the internal supply blower unless the exhaust flow is sufficient to provide the correct air barrier inflow velocity at start up.

11. Cabinet shall contain a control system that provides the following optional functional features (included with cabinet, but must be configured during certification):
    - Security password protection of cabinet use.
    - Night setback mode. Used to reduce exhaust volume during non-use times. Allows Building Automation System (BAS) contact closure input for cabinet indication of night setback mode.
    - Auto run timer allows the cabinet to automatically turn on and off on a daily basis.
    - Timer/Interlock functions for fluorescent light, outlet and ultraviolet light.

12. The cabinet shall be easily transportable through a standard 36 inch (914mm) wide door without disassembly.

13. Sound level shall be no more than 63 dbA measured 15 inches (381mm) above the work tray and 12 inches (305mm) in front of viewing window.

14. Fluorescent lighting shall be externally mounted and provide 80 to 150 foot-candles (860 to 1600 LUX) on work surface. The ballast to be electronic containing thermal protection with automatic reset.

*15. Cabinet shall come standard with one duplex outlet with drip proof covers on left front faring. Two gas valve/service couplings on right side wall.

16. Both supply and exhaust cabinet duct connections shall be 12 inches (305mm) (10 inches (254mm) NU-430-300) in diameter.

17. Cabinet shall be easily converted to a free-standing console model with the addition of the optional base support stand.

*18. Cabinet work zone shall be all 16 GA. stainless steel and reinforced with stainless steel U channels to minimize vibration.

19. A 3/8 inch (10mm) ball valve shall be provided in the drain trough beneath the work tray.

20. Cabinet shall have a permanent positive pressure plenum with quick release supply filter removal.

*21. Motor/blower shall be positioned so as to create an even filter loading, thereby prolonging the life of the supply HEPA filter, automatically handling a 250% minimum increase in filter loading without reducing total air delivery by more than 10%.

*22. Cabinet shall be capable of front filter removal without disassembly of the control panel and sliding window tracks/hardware.

23. The following optional equipment shall be available to support installation and user requirements:

Bag In/Bag Out of Exhaust HEPA Filter with Single Point External Filter Release
Ultraviolet Light
Additional Service Valves for Gas, Air, Vacuum
Remote Service Valves
Additional Duplex Outlet
Ground Fault Interrupter for Electrical System
IV Bar with 6 Stainless Steel Hooks
Gas Tight Butterfly Valves (Manual or Automatic)
Base Support Stand - (available in standard working surface heights of 30 or 36 inches (762 or 914mm) with or without storage shelves)
Adjustable Control for Support Stand or Storage Cabinet
Hinged Viewing Window
Microscope Viewing Window
Sink with Hot/Cold or DI Water Faucets
Storage Pull-Out Trays
Sorbent Exhaust Filter Module
Decorative Side Panels (hides plumbing fixture connections)
Prefilter for Supply Air
Metal Framed HEPA Filters
HEPA Filters 99.999% @ 0.3 Micron
Arm Rest (Stainless Steel)
Elbow Rests

*Having all of these features is unique ONLY to NuAire cabinets.
** NU-430-300 Containment test performed by NuAire, Inc.

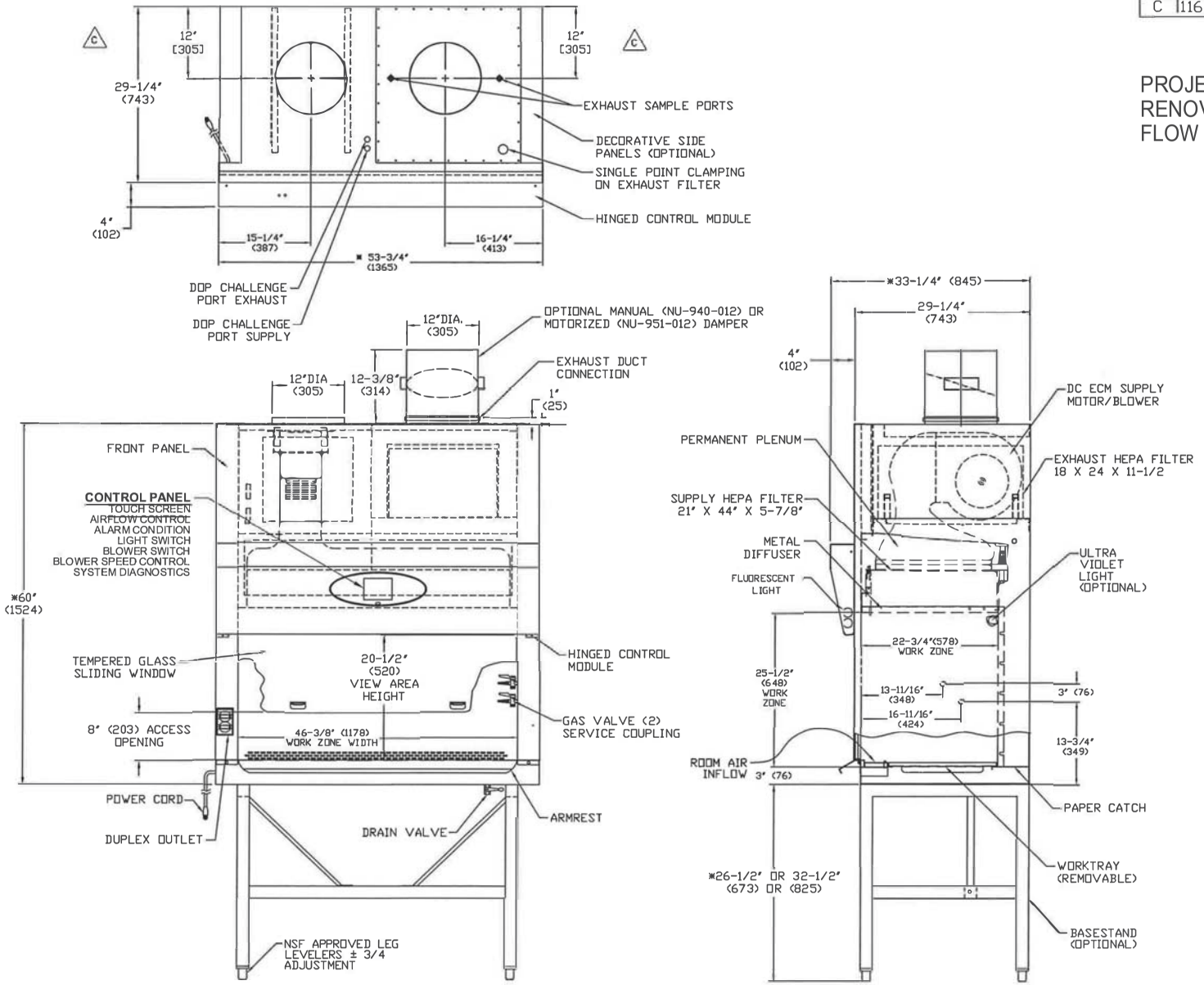
Labgard ES Energy Saver Class II, Type B2
Laminar Flow Biological Safety Cabinet
NU-430-300/400/600

Catalog Number	Catalog Number		
	NU-430-300 **Nominal 3 foot (0.9m)**	**NU-430-400** **Nominal 4 foot (1.2m)**	**NU-430-600** **Nominal 6 foot (1.8m)**
Performance Specifications 1. Personal Protection 2. Product Protection	NSF/ANSI 49	NSF/ANSI 49	NSF/ANSI 49
NSF Std. No. 49 Class	Class 11, Type B2	Class 11, Type B2	Class 11, Type B2
Style of Cabinet	Bench Top/Console w/Basestand/ Storage Cabinet	Bench Top/Console w/Basestand/ Storage Cabinet	Bench Top/Console w/Basestand/ Storage Cabinet
Cabinet Construction	All Welded Stainless Steel 16GA, Type 304 Pressure ight Design	All Welded Stainless Steel 16GA, Type 304 Pressure Tight Design	All Welded Stainless Steel 16GA, Type 304 Pressure Tight Design
Diffuser for Air Supply (Metal)	Non-Flammable	Non-Flammable	Non-Flammable
HEPA Filter Seal Type: Supply Filter-99.99% Eff. on 0.3 Microns Exhaust Filter-99.99% Eff. on 0.3 Microns	 HEPEX Seal Neoprene, Spring loaded	 HEPEX Seal Neoprene, Spring loaded	 HEPEX Seal Neoprene, Spring loaded
Fumigation per NIH/NSF Procedure	Yes	Yes	Yes
Standard Services: Service Coupling (3/8 inch NPT) Gas Valve/Service Coupling (3/8inch NPT) Duplex Outlet	 None Two, Right Sidewall One, Left Front Faring	 None Two, Right Sidewall One, Left Front Faring	 None Two, Right Sidewall One, Left Front Faring
Optional Services: Gas Cocks 3/8" NPT Remote Controlled Valves** Ultraviolet Light Standard/Cup Sinks	 Up to 3 ea. Sidewall Up to 3 ea. Sidewall One, Backwall Left or Right Work Surface	 Up to 3 ea. Sidewall Up to 3 ea. Sidewall One, Backwall Left or Right Work Surface	 Up to 3 ea. Sidewall Up to 3 ea. Sidewall One, Backwall Left or Right Work Surface
Cabinet Size Inches (mm): Height (Fully Assembled) Height (Minimum for Transport) Width Depth (with Control Center)	 61 (1549) 61 (1549) 37 5/8 (956) 32 7/8 (835)	 61 (1549) 61 (1549) 53 5/8 (1362) 32 7/8 (835)	 61 (1549) 61 (1549) 77 5/8 (1972) 32 7/8 (835)
Work Access Opening Inches (mm): Standard Opening Height Standard Inflow Velocity	 8 (203) 105 FPM (.53 m/s)	 8 (203) 105 FPM (.53 m/s)	 8 (203) 105 FPM (.53 m/s)
Work Zone Inches (mm): Height Width Depth	 25 1/2 (648) 30 3/8 (772) 23 1/2 (597)	 25 1/2 (648) 46 3/8 (1178) 23 1/2 (597)	 25 1/2 (648) 70 3/8 (1788) 23 1/2 (597)
Viewing Window Inches (mm): Standard is Tempered Sliding Glass Hinged Tempered Glass (optional)	1.0” (25mm) Closed 18 1/2 (470) Open 8 (203) Access Opening	1.0” (25mm) Closed 18 1/2 (470) Open 8 (203) Access Opening	1.0” (25mm) Closed 18 1/2 (470) Open 8 (203) Access Opening
Certification Exhaust Value CFM/CMH Concurrent Balance Value CFM/CMH+	496 (843) 546 (928)	754 (1281) 785 (1334)	1100 (1867) 1250 (2124)
Exhaust Duct Collar Dia. Inches (mm):	8 (203)	12 (305)	12 (305)
Plant Duct Static Pressure Eng/Metric	1.5” w.g. / 38mm w.g.	1.7” w.g. / 43mm w.g.	1.8” w.g. / 46mm w.g.
Heat Rejected,BTU,Per Hour	364	474	584
Electrical: 115V/(230V) Volts, AC (Hz) ++Amps: Blower/Lights Amps: Duplex Amps: Total 12 ft. Power Cord (one)	U.L./U.L.-C (115V) 115, 60 1.8 3 8 14 GA - 3 Wire, 15A	U.L./U.L.-C (115V) 115, 60 2.1 3 8 14 GA - 3 Wire, 15A	U.L./U.L.-C (115V) 115, 60 2.6 3 10 14 GA-3 Wire, 15A Std.
Crated Shipping Weight: Net Weight	510 lbs. / 209 kg. 460 lbs. / 231 kg.	570 lbs. / 259 kg. 520 lbs. / 236 kg.	760 lbs. / 345 kg. 710 lbs. / 322 kg.

**Remote controlled valve handles project through front faring. Decorative side panels are available to cover plumbing.
+Concurrent Balance Value shall be used for design and balance exhaust/supply HVAC requirements.
++Based on cabinet with new filters running at 115 VAC.

REV	ECO	DESCRIPTION	DATE	DRFT	CHKD
C	11642	UPDATED, 12" WAS 13", 12" WAS 11-5/8"	6/21/12	DHH	DSH

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL PATHOLOGY
FLOW CYTOMETRY FC05, FC06



INCHES (MILLIMETERS)

ORIGINAL

* OVERALL DIMENSIONAL TOLERANCE ±1/4 (6.35)
ALL OTHER DIMENSIONS ±1/8 (3.17)

NU-430-400
CLASS II,TYPE B2 (ENERGY SAVER)
BIOLOGICAL SAFETY CABINET

DFTM	AW	11/11/10	CHKD	BP	SHEET 1 OF 1

DRAWING NUMBER BCD-12154 C

3.1 Main illustration

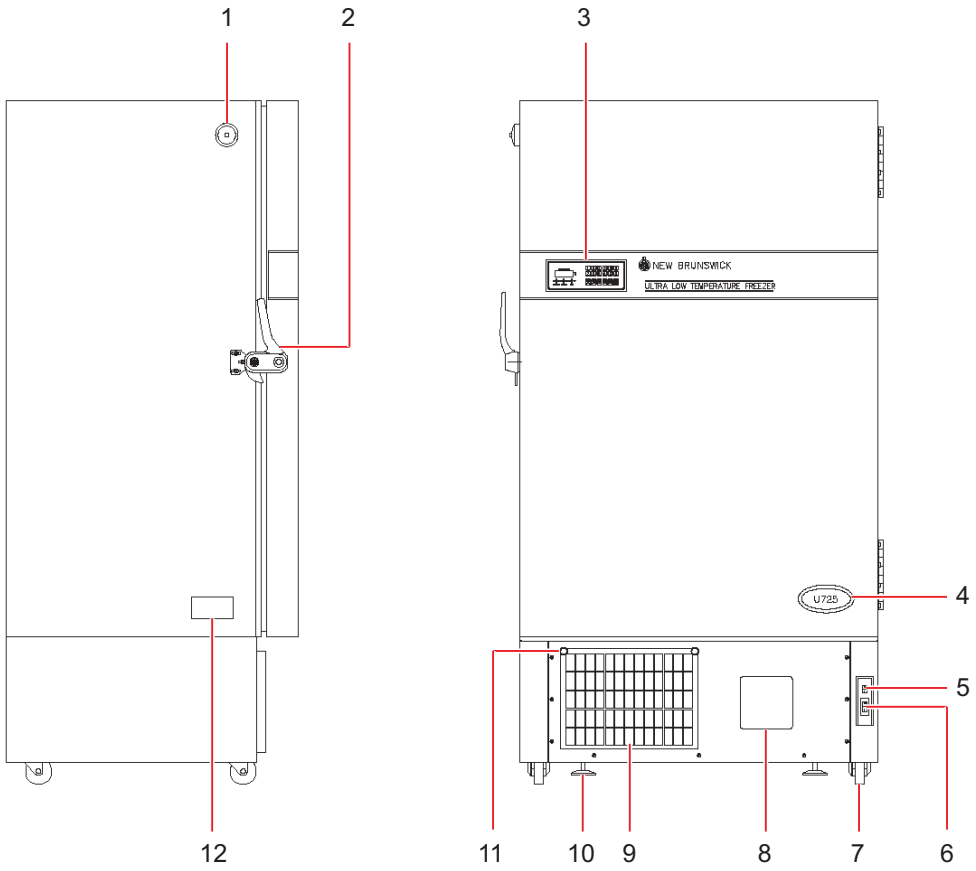


Fig. 1: Upright freezer - side and front views

1 Heated vent port	2 Door handle (lockable)
3 Control panel/display	4 Model label
5 Battery switch behind lockable panel	6 On/Off circuit breaker behind lockable panel
7 Transport castors	8 Chart recorder (optional)
9 Air filter grille	10 Adjustable feet
11 Quarter turn fastener	12 Specification plate

9 Technical data

9.1 Specifications

9.1.1 Upright freezers specifications

Model No.	U101	U535	U725
Part No.	U9420-000**X***	U9430-000**X***	U9440-000**X***
Internal Dimensions: **Height x Width x Depth**	640 x 480 x 330 mm 25.2 x 18.9 x 13 in	1365 x 640 x 615 mm 53.7 x 25.2 x 24.2 in	1365 x 865 x 615 mm 53.7 x 34.0 x 24.2 in
External Dimensions: **Height x Width x Depth**	830 x 900 x 566 mm 32.7 x 35.4 x 22.3 in	1950 x 800 x 867 mm 76.8 x 31.5 x 34.1 in	1950 x 1025 x 867 mm 76.8 x 40.4 x 34.1 in
Capacity	101 Liters 3.6 cubic feet	535 Liters 18.9 cubic feet	725 Liters 25.6 cubic feet
Net Weight	116 kg 256 lb	250 kg 551 lb	315 kg 693 lb
Lock	Standard	Standard	Standard
No. Compartments	2	3	3
Interior	Stainless steel grade 304L		
Alarms	High/Low temperature, power fail, battery low, filter clean, fault		
Insulation Material	Vacuum insulation panels and urethane foam		
Remote alarm port	Standard	Standard	Standard
RS-485 interface	Optional	Optional	Optional
Refrigerants:	High Stage Refrigerant: R404A / Low Stage Refrigerant: R508B		
‡Power Consumption:			
• **120 V electrical supply**	265 Watts	550 Watts	N/A
• **208 - 230 V electrical supply**	N/A	550 Watts	685 Watts
• **230 V electrical supply**	367 Watts	550 Watts	660 Watts
Mains/Power Source and Current Rating:			
120 V, 60 Hz	13 A	16.5 A	N/A
208 - 230 V, 60 Hz	N/A	9 A	10 A
230 V, 50 Hz	5 A	5 A	9.5 A
Pull Down Time: From +25 °C to -85 °C (freezer empty; 240 V, 50 Hz electrical supply)			
	3.7 hours	5.3 hours	5.6 hours
Performance	-50 °C to -86 °C at 32 °C maximum ambient operating temperature		
Environmental Conditions	All freezers use components tested to CE/UL specifications listed below: • Indoor use • Altitude up to 2000 m • Ambient temperature range 10 °C to 32 °C • Maximum relative humidity 80 % for temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C • Mains/power supply voltage fluctuations not to exceed ± 10 % of the nominal voltage • Installation category II • Pollution degree 2		

* **X** = 0 for 120 V, 2 for 208 - 230 V (N/A for U101), or 1 for 230 V

‡ Freezer set to -80 °C, ambient 20 - 25 °C at rated mains/electrical supply

Heraeus Multifuge X3R

FULL SPECIFICATIONS

Max. Speed	15200rpm
Capacity	4 x 1000mL (4L)
Refrigerated	Yes
Max. RCF	25314 x G
Hertz	60Hz
Voltage	120V
Temperature Range (Metric)	-10° to +40°C
Control	Microprocessor
Display	Digital
Height (English) Exterior	14.2 in.
Height (English) Open Cover	34.5 in.
Height (Metric) Exterior	36cm
Height (Metric) Open Cover	90cm
Length (English) Exterior	26.4 in.
Length (Metric) Exterior	67kg
Memory	99 programs (5 with direct access key)
Motor Type	Direct, brushless induction, low-profile
Net Weight (English)	255.7 lb.
Net Weight (Metric)	116kg
Timer	99 hrs., 59 min. plus HOLD
Width (English) Exterior	29.3 in.
Width (Metric) Exterior	74.5cm
Item Description	X3R (Refrigerated), 120V 60Hz
Certifications/Compliance	IVD compliant; IEC 61010-1, IEC 61010-2-020, IEC 61010-2-101; 230V models meet EN 292, EN 61326, EN 55011B. UL, CE, CSA, Certified Biosafety
Type	Benchtop model
Description	Heraeus Multifuge X3R
Electrical Requirements	120V 60Hz
Dimensions (L x W x H) Exterior	26.4 x 29.3 x 14.2 in. (67kg x 74.5 x 36cm)

75004516

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL
PATHOLOGY
FLOW CYTOMETRY FC16

DSX®
4-Plate ELISA Processing System

Modular.
Flexible.
Reliable.

A Perfect Combination

DYNEX™ TECHNOLOGIES

Pioneering Microplate Technology for more than 50 Years

Immunology • Infectious Disease • Autoimmune • Allergy

About Dynex Technologies

Dynex™ is a leading manufacturer of microplate instrumentation, seamlessly integrating advanced detection with fully-automated sample handling, consumables and accessories. As of 2014, over 2,800 DSX® systems and 1,600 DS2® systems are in use worldwide in numerous applications including clinical diagnostics, drug discovery, biomedical research and industrial operations, among others. Headquartered in Chantilly, Virginia, Dynex has a proven track record of high quality products and excellent service and support.

The trusted standard – DSX®. An open, modular ELISA processing system by Dynex Technologies, designed specifically for busy laboratories that require advanced automation.

DSX takes microplate analysis to the next level. Powerful, yet cost-effective, DSX can handle virtually any automatable ELISA immunoassay delivering all you need to ensure the rigorous, repeatable analyses required in critical applications.

The most advanced and user-friendly control system available, designed with full walkaway capability. DSX is raising the bar.

DYNEX™
Perpetual Innovation

Food Safety • Forensics • Enteric

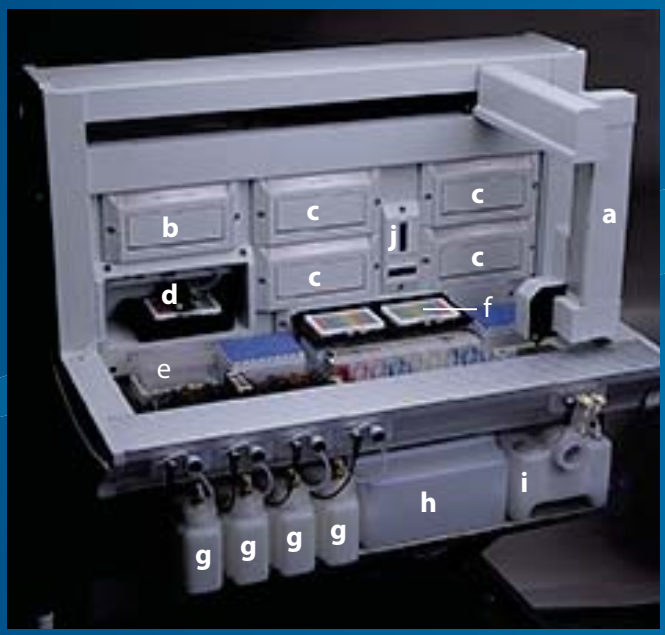
The Leader in Microplate Automation

The DSX® is a fully-automated, 4-plate processing system that is capable of performing multiple assays per plate. The DSX's modular design provides flexible configuration and was developed with ease-of-use in mind. The DSX incorporates many features that ensure the quality and security of results and has the performance to handle a wide variety of assays. Simply put, the DSX offers flexible and reliable sample-in/result-out processing for true walkaway automation.

Modularity

DSX's modular design facilitates upgrades, repairs and reconfiguration. The following modules, which can be quickly and easily removed and/or installed, are available for the DSX:

- Reader
- Washer
- Incubators (space for four)
- Sample ID
- Ambient Drawer
- Electronics Pod (standard)



The DSX System:

a. Robotic arm
b. Reader
c. Incubators
d. Washer
e. Samples
f. Ambient drawer
g. Washer bottles
h. Tip disposal
i. Liquid waste disposal
J. Sample identification

The Benefits of Modularity:

Simple Upgrades… As your laboratory needs grow, the DSX can be easily upgraded by sliding a new module into an existing position. The DSX software automatically recognizes the new module.

Simple Repairs… Minimize the impact on your lab's operations and throughput with Dynex's rapid global delivery service of replacement modules. Most DSX repairs do not require a service technician and literally take minutes to complete, saving you both time and money. Just call Dynex and tell us what you need. We'll ship the new module to you by express.

Ease-of-Use

The DSX® is simplicity at its finest. Installation, programming, assay set-up and daily maintenance are all designed to keep you focused on your results, not on the instrument.

- **Installation** – Factory trained Dynex technicians can have your DSX up and running in just a few hours.
- **Software** – Revelation® data analysis software offers a graphical user interface with intuitive Windows®-based operation. The following advanced features facilitate assay performance:
  - The Data Reduction Wizard simplifies the programming of even the most complex assay configurations and calculations.
  - Online Help is available to assist with assay set-up and programming.
- **Worklist Set-Up** – The Worklist Load Wizard walks you through the process of setting up the DSX worklist, graphically showing where to place reagents, samples and plates at the beginning of each run.
- **Maintenance** – Daily maintenance can be completed in just a few minutes, including removal of consumables and rinsing the washer.

Assay Performance

Pipetting Precision. The pipette uses disposable tips to ensure zero carryover.

Pipette precision and accuracy measures:

	Precision (relative to SD)	Accuracy (delivered volume within 2% nominal)
Sample Tip	<3% above 10 µl	± 2% above 10 µl accuracy
Reagent Tip	<3% @ 50 µl	± 2% @ 50 µl accuracy

Rapid pipetting speed minimizes assay drift, ensuring consistent results across the plate and plate-to-plate.

Consistent Washing. DSX's unique washer synchronization feature ensures consistent results across the plate, eliminating plate drift issues and lowering overall CVs. Several user-definable options provide significant programming flexibility:

- Plate-specific height settings
- Super Sweep mode that aspirates liquid in both the X- and Y-axis of plate wells, leaving minimal residual volume
- Well-bottom washing lowers the dispensers to more thoroughly "clean" the base of each well
- Critical washer timing that mimics manual wash steps

Environmental Control. The dark, protective cover extends over the entire work area of the DSX, locking in place during operation. This cover:

- Protects samples, reagents and reactions from exposure to common environmental contaminants such as light, dust or alkaline phosphatase
- Eliminates assay interruptions required to place or remove light-sensitive reagents
- Contains potential washer aerosols

The DSX's robotic arm moves microplates and pipettes all samples and reagents.

Dynex Certified Consumables and Service

The DSX® system's innovations include more than just the instrument – the controlled system also includes the sample and reagent tips used. ONLY Dynex Certified Consumables are specifically designed and produced for Dynex instruments, ensuring proper tip fit with superior accuracy and performance. Beware of imitators who have tried and failed to replicate Dynex's tip designs, leading to unreliable results.

Dynex is known for building robust systems built to last many years with frequent use, but regular maintenance and servicing are also essential to sustain peak performance. Dynex offers several tiers of service contracts to help keep your DSX running like new for years to come. Contact Dynex or your authorized Dynex distributor for more details.

QC Features/Process Security

Revelation® Software. Revelation offers powerful QC equations that monitor daily assays. Revelation incorporates Levey-Jennings statistical analysis as part of the onboard comprehensive QC monitoring of assay performance.

LIMS Interface. The LIS-Link application is an optional software package that can be installed on the DSX PC. The LIS-Link application allows the DSX to communicate with the laboratory host computer to download pending test orders and to upload completed assay results.

Learned Error Recovery. To support walkaway automation, the DSX can be trained to perform appropriate error recovery actions if an error condition is detected.

Cover Lock. The dark cover locks automatically when the DSX begins to run, protecting reagents from room light and protecting both samples and reagents from interference.

Sample Identification. An on-board barcode reader tracks samples and plates in process.

Alarms. "Wash Buffer Low" and "Waste Full" alarms.

Pipette Security. Fluid level sensing, tip detection, tip-ejection and clot detection functions protect assays as well as the DSX robotic pipette.

DYNEX™ TECHNOLOGIES

Dynex support is just an email or phone call away:
techservice@dynextechnologies.com
800.288.2354 or 703.631.7800
press option 4

DSX® Specifications

Physical Specifications

Dimensions

Width:	<1060 mm	42 in
Depth:	<910 mm	36 in
Height:	<800 mm	32 in
Footprint:	<1060 x 610 mm	42 x 24 in
Bench weight:	136 kg (max)	300 lbs (max)
Ship weight:	244 kg (max)	537 lbs (max)

Power Supply

Voltage:	100 – 240 V automatic conversion
Frequency:	50/60 Hz
Power consumption:	<800 VA "online" UPS recommended

Reader Specifications

Photometric range:	0.000 to 3.000 OD
Spectral range:	405 nm to 690 nm
Precision:	±0.010 OD at 0.000 to 0.500 OD <1% CV at 0.501 to 2.000 OD <1.5% at 2.001 to 2.500 OD
Accuracy:	±0.01 OD or 2.5% (0.000 to 3.000 OD) whichever is greater
Read time:	<10 seconds, single wavelength# <20 seconds, dual wavelength#

Washer Specifications

Manifold configuration:	8-way
Programmable volumes:	50 – 999 µL
Wash containers:	4 wash bottles at 2.0 L, with level-sensing
Waste container:	8 L with waste full sensor
Residual wash volume:	<3 µl per well with dual-axis sweep in a flat-bottom plate
Dispense precision:	≤5% CV (with 300 µl in a 96 well plate)

Incubator Specifications

Number of incubators:	Up to 4
Temperature range:	RT + 7° C to 50° C
Temperature accuracy:	± 1° C
Shaking:	>15 Hz periodic or continuous

Pipetting Specifications

Number of plates:	4
Number of assays:	1 assay per strip or up to 12 assays per plate
Number of sample tubes:	96
Number of reagents:	24
Number of standard/control bottles:	33
Number of pipettes:	1

Reagent Pipetting

Reagent tip size:	1300 µl
Number of reagent tips:	41
Reagent pipetting volume:	25 – 1000 µl
Reagent pipetting precision:	≤3% CV at 10 shots at any volume in operating range above 50 µl
Reagent pipetting accuracy:	+/- 2% of target volume at 50 uL or greater in operating range (single-shot mode)

Ordering Information

65100 DSX Ambient System (no incubators)
65200 DSX System with 2 incubators
65400 DSX System with 4 incubators
65600 Incubator Module
65700 Sample ID Barcode Scanner Module

Consumables

65930 1mL Deep Well Microplate
62910 Deep-well strips (250/box)
62920 Reagent tubes, 25 mL (10/pack)
65950 Reagent tubes, 25 mL (24/Pack)
65920 Reagent tips (432/box)
65910 Sample tips (432/box)
65940 Control vials w/caps (33/pack)

Process Security

Liquid-level sensing:	Yes (reagents, controls and samples)
Level-sensor system:	Pressure differential
Clot detection:	Yes
Dispense-anomaly detection:	Yes
Tip detection:	Yes
Well-fill verification:	Yes
Alarms:	Yes

Sample Pipetting

Sample tip size:	300 µl
Sample pipetting volume:	10 – 250 µl 10 – 250 µl single-shot 25 – 100 µl multi-shot
Estimated cycle time for sample pickup to delivery on plate:	<8 seconds^
Time to dispense:	19 minutes (typical)^ 50 µl of 96 samples to plate from sample tubes or deep well plates
Sampling time w/dilutions: Example:	<26 minutes (typical)^ 2 stage dilution, 20 µl sample to 400 µl buffer in <26 minutes
Single-shot sample pipetting precision:	≤3% CV at any operating volume above 10 µl
Single-shot sample pipetting accuracy:	±2% of target volume at any operating volume above 10 µl
Dilution range:	1 part in 190 one-stage dilution, 1 part in 36,100 two-stage dilution
Number of sample tips loaded:	4 racks of 108
Sample tube dimensions:	Sample Rack Options Short: 40-75 mm Tubes Long: 75-100 mm Tubes

DYNEX™ TECHNOLOGIES

OEM capability for assay development

DYNEX Technologies
Corporate Headquarters
14340 Sullyfield Circle
Chantilly, VA 20151-1621 USA
703.631.7800 Phone
703.803.1441 Fax
800.288.2354 U.S. Toll free
customerservice@dynextechnologies.com

DYNEX Technologies Ltd.
Worthing, UK
adminuk@dynextechnologies.com

DYNEX Technologies GmbH
Denkendorf, Germany
dynexgermany@dynextechnologies.com

DYNEX Technologies, Inc.
Hong Kong
dynex-asia@dynextechnologies.com

IEC/EN 61010-1:2001
IEC/EN 61010-2-010:2003
IEC/EN 61010-2-081:2002
IEC/EN 61010-2-101:2002
UL 61010-1:2001
CSA C22.2 No. 61010-1
EMC: IEC 61326-1:2005(EN 61326-1:2006)
IEC61326-2-6:2005(EN61326-2-6:2006)

Intertek ISO 13485 CERTIFIED. SFDA REGISTERED

Specifications are subject to change without notice.

Measured reading time is an average depending upon run conditions.

^ Typical pipetting time is an average. For any given system, the result may vary, either shorter or longer than 15 minutes.

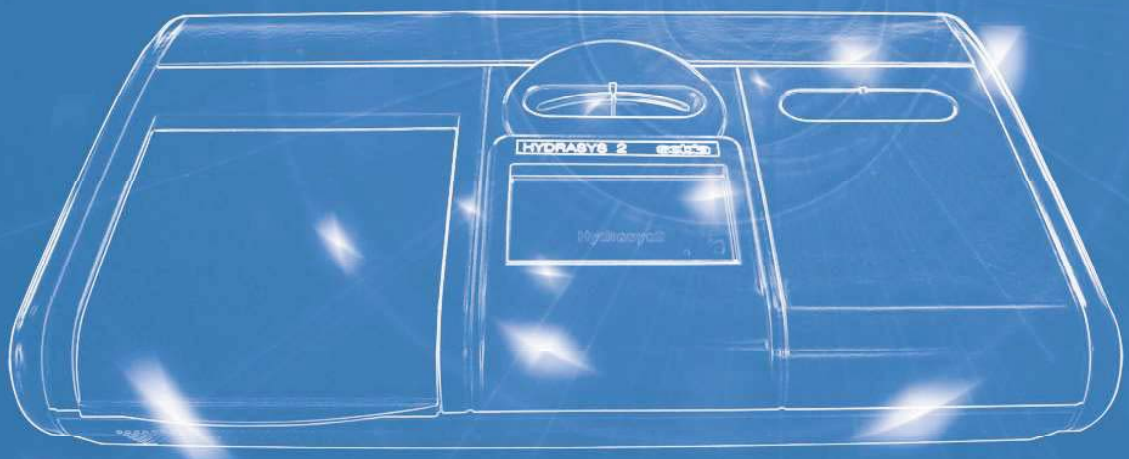
* Factory calibration of the pipette module are carried out using a calibration fluid.

DSX is a general purpose microplate processor. It is the customer's sole responsibility to determine the DSX system's suitability for a particular application, including any clinical application, and validate the product for that use in compliance with all applicable legal requirements and policies.

Dynex makes no representations, warranties, or performance claims with respect to the performance of DSX for any specific application, including clinical application, or for the use of the DSX system with any reagents, assays, or other products.

95000010 Rev B

HYDRASYS 2



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HYDRASYS 2

THE NEW AUTOMATED MULTIPARAMETRIC AGAROSE GEL ELECTROPHORESIS SYSTEM

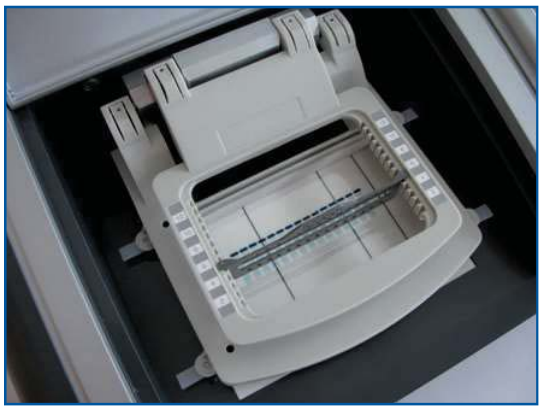
The HYDRASYS 2 system is designed to automate electrophoresis testing. The instrument can accomodate and adapt to any workload - from the smallest to the largest. The system is compact and can easily fit in all sized laboratories, even into the smallest work area.

With this easy-to-use system, operators can rapidly perform any agarose gel electrophoresis from the HYDRAGEL series: Protein, Proteinuria, IF, Lipoproteins, Hemoglobins, LDL/HDL Cholesterol and Iso-enzymes.

With the FOCUSING option, the system is also equipped with a High-Voltage module enabling the user to run iso-focalization programs such as CSF IEF and A1AT IEF.

The instrument is designed to provide user-friendliness, with all of the system functions controlled through an easy-to-read, color LCD touch-screen with back-lit panel.

HYDRASYS 2 is a self-contained, complete system which automatically carries out all the different phases of electrophoresis testing including: sample application, migration, incubation, staining, destaining, washing, and drying.



TECHNICAL SPECIFICATIONS

SAMPLE APPLICATION

- Applicators: 6, 7, 15 or 18 samples for 7, 15, 30 or 54 gels and 1, 2, 4 or 9 IF/BJ gels
- Disposable microporous applicators
- Optimized application utilizing vertical movement
- Automated application controlled through software

MIGRATION, INCUBATION, DRYING

- 48 migration programs
- Automatic stop: time or volt-hour
- Voltage, current and power regulation:
  - Standard module: 0-350 V, 0-100 mA, 0-35 W
  - Iso-focalization module: 0-1500 V, 0-10 mA, 0-25 W (with the FOCUSING Option - Ref. 1207)
- Temperature controlled by Peltier system
- Drying assisted by additional heating elements

STAINING, DESTAINING, DRYING

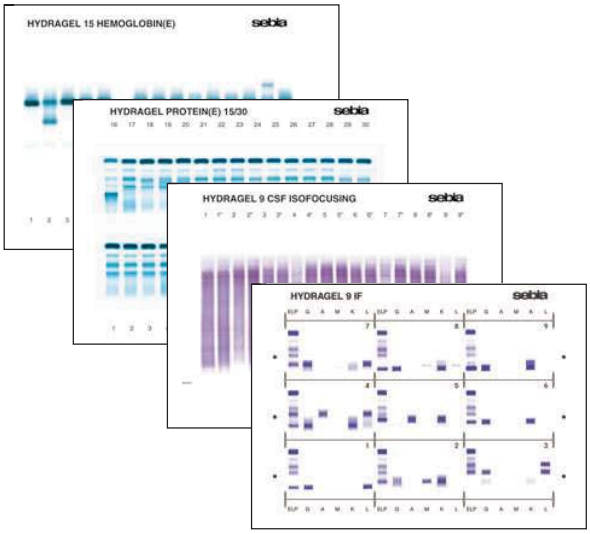
- 9 staining programs + 3 washing programs
- Staining/destaining compartment with level detectors and constructed from composite material
- Entry/exit of liquids controlled by a 10-way valve
- Magnetically driven gear pump
- Drying by convection heater with tangential air flow

GENERAL SPECIFICATIONS

- Safety lid-locks on the migration and staining compartments
- Test and control programs - Alarms
- Upgradable software: update using SD card port
- System controlled by a color LCD touch screen with back-lit panel
- Voltage: 115/230 +/- 10% - 50/60 Hz
- Power: 1000 VA
- Dimensions : L 758 mm x H 211 mm x W 479 mm - Weight: 35 kg
  L 29.8 in. x H 8.3 in. x W 11.0 in. - Weight 77.1 lbs.

REFERENCES

- HYDRASYS 2- Ref. 1200
- Focusing Option - Ref. 1207



sebia Benelux s.a. / n.v.
Jan Olieslagerslaan,41
1800 Vilvoorde
Belgique / België
Tel. : 32 (0)2 702 64 64
Fax : 32 (0)2 702 64 60
e-mail : sebia.benelux@sebia.be

sebia Brasil Ltda
Rua Gomes de Carvalho, 1356
Vila Olimpia
Sao Paulo - SP - CEP 04547- 005
Brasil
Tel. : 0055 11 38490148
Fax : 0055 11 38419816
e-mail : sebia@sebia.com.br

sebia GmbH
Münsterfeldallee, 6
36041 Fulda
Deutschland
Tel. : 49 (0)661 3 30 81
Fax : 49 (0)661 3 18 81
e-mail : sebia@sebia.de

sebia Hispania S.A.
C / Sicilia, n° 394
08025 Barcelona
España
Tel. : 34 93 208 15 52
Fax : 34 93 458 55 86
e-mail : sebia@sebia.es

sebia Inc.
400-1705 Corporate Drive
Norcross, GA 30093
U.S.A.
Tel. : 1 770 446 - 3707
Fax : 1 770 446 - 8511
e-mail : info@sebia-usa.com

sebia Italia S.r.l.
Via Antonio Meucci, 15/a
50012 Bagno a Ripoli (FI)
Italia
Tel. : 39 055 24851
Fax : 39 055 2485400
e-mail : info@sebia.it

sebia UK Ltd
River Court, Meadows Business Park
Station Approach, Blackwater
Camberley, Surrey, GU17 9AB
United Kingdom
Tel. : 44 (0)1276 600636
Fax : 44 (0)1276 38827
e-mail : info@sebia.co.uk

sebia
Representative office
333 JiuJiang Road, 22/FL
Shanghai 200001
China
Tel. : 00 86(21) 6361 2010
Fax : 00 86(21) 6361 2011
e-mail : sebia@sebia.cn

sebia
Parc Technologique Léonard de Vinci
CP 8010 Lisses - 91008 EVRY Cedex - France
Tél. : 33 (0)1 69 89 80 80 - e-mail : sebia@sebia.com

Project No. 664-14-427
1st Floor Northwest (1NW) - Clinical Lab Phase lll
Department of Veterans Affairs, San Diego Healthcare System.

Part 3 – Blood Draw Equipment

PROJECT NO. 664-14-427
RENOVATE ANATOMICAL PATHOLOGY

BLOOD DRAW, BD-014

HEALTHCARE SOLUTIONS

THE VALET POINT-TO-POINT PNEUMATIC TUBE SYSTEM

Inspired solution for simple delivery between two dedicated points. The Valet is designed for reliable and accurate material transport between departments or as a low-cost and easy-to-maintain complement to existing whole-system solutions.

Features

- LED Status Indicator provides visual feedback
- Optional Arrival Annunciator for audio notification
- Clear polycarbonate locking door for unobstructed viewing and security
- Sensors monitor and confirm proper door closure and efficient air seal
- Steel construction with powder-coated finish for heavy-use
- Available for transport of 4-inch or 6-inch carriers

Benefits

- **Compact.** Designed for countertop, pedestal and wall-mount applications.
- **Safe.** Air-cushioned delivery protects fragile and sensitive loads weighing up to 6 pounds.
- **Fast.** Transports up to 25 feet per second.
- **Economical.** No power is required at the station.
- **Versatile.** Accommodates Swisslog Universal, EcoSeal™ and NexSeal™ carriers, as well as other manufacturers' carriers

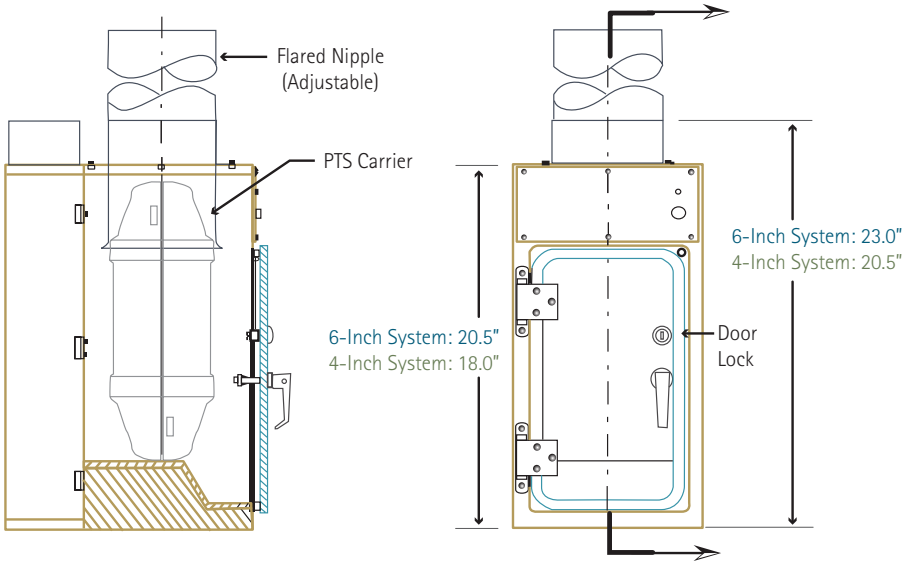
swisslog
inspired solutions

THE VALET POINT-TO-POINT PNEUMATIC TUBE SYSTEM

Valet Station

Electromechanical
drive mechanism

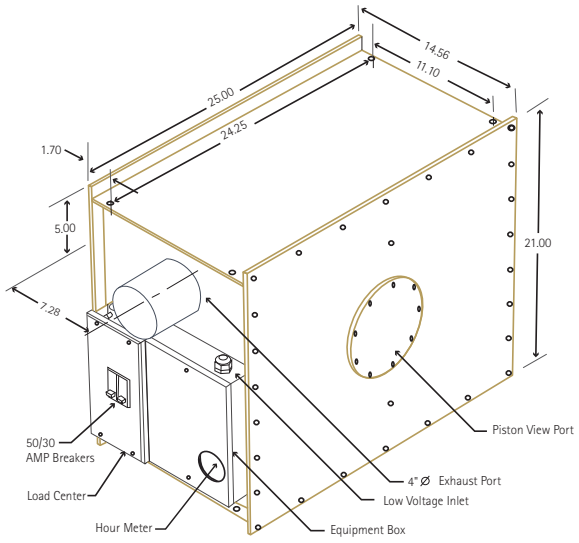
Station Control Requirements
Four conductor plenum-rated cable, #22 AWG stranded, 24 VAC maximum open circuit voltage.



Valet Blower Unit

Power Requirements
117 VAC ± 10% (dedicated) single-phase, 60 Hz
(6-inch: 50 amps, 4-inch: 30 amps).

Control Requirements
Four conductor plenum-rated cable,
#22 AWG stranded, 24 VAC maximum open circuit voltage.



swisslog
inspired solutions

For More Information in North America:
Swisslog Healthcare Solutions
Email: healthcare@swisslog.com
USA: 800.764.0300 | Canada: 877.294.2831 or 905.629.2400
www.swisslog.com
SwisslogHealthcareSolutions SwisslogNA SwisslogHCS

VALET STATION SPECIFICATIONS:

POWER REQUIREMENTS:

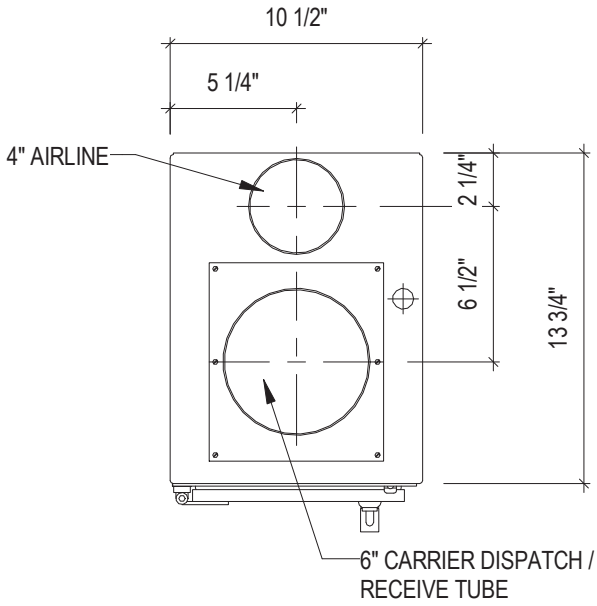
Primary Station: 24 VAC received from blower comm cable
Secondary Station: 24 VAC received from primary station cable

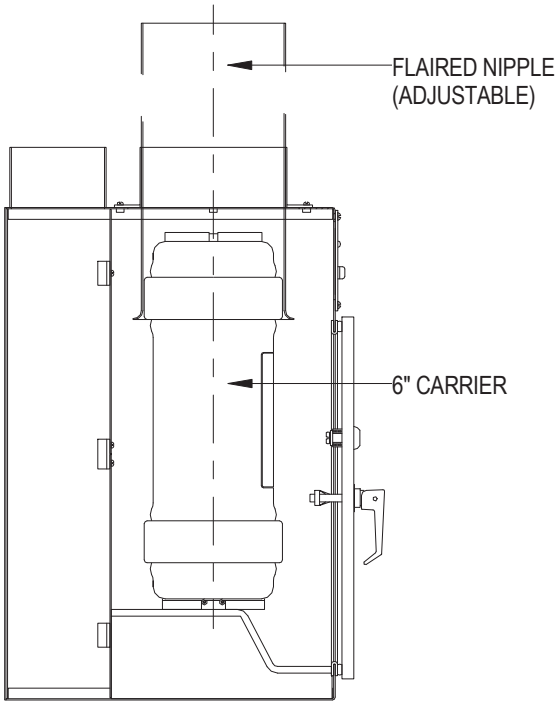
CONTROL REQUIREMENTS:

4-conductor plenum rated insulated cable, #22 AWG shielded twisted pair w/ground wire 5 VDC maximum open circuit voltage, 20 mA maximum short circuit current

ENVIRONMENTAL REQUIREMENTS:\

OPERATING TEMPERATURE: 0 to 100° F
STORAGE TEMPERATURE: -20 to 180° F
RELATIVE HUMIDITY: 0 to 90%





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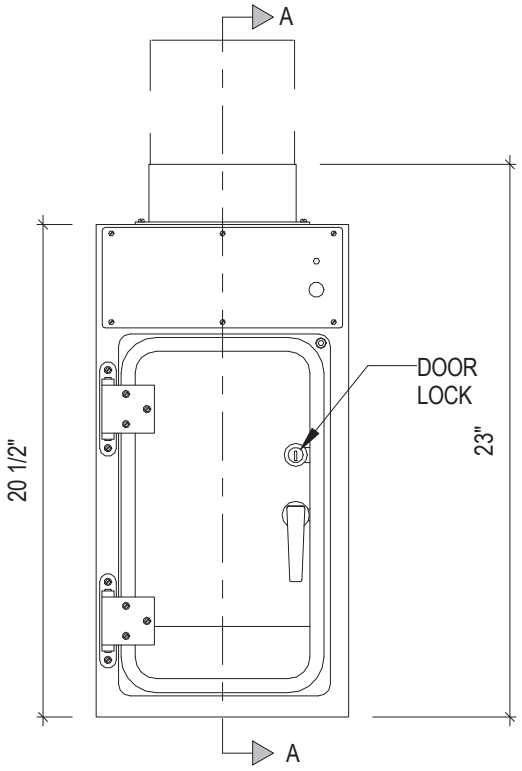

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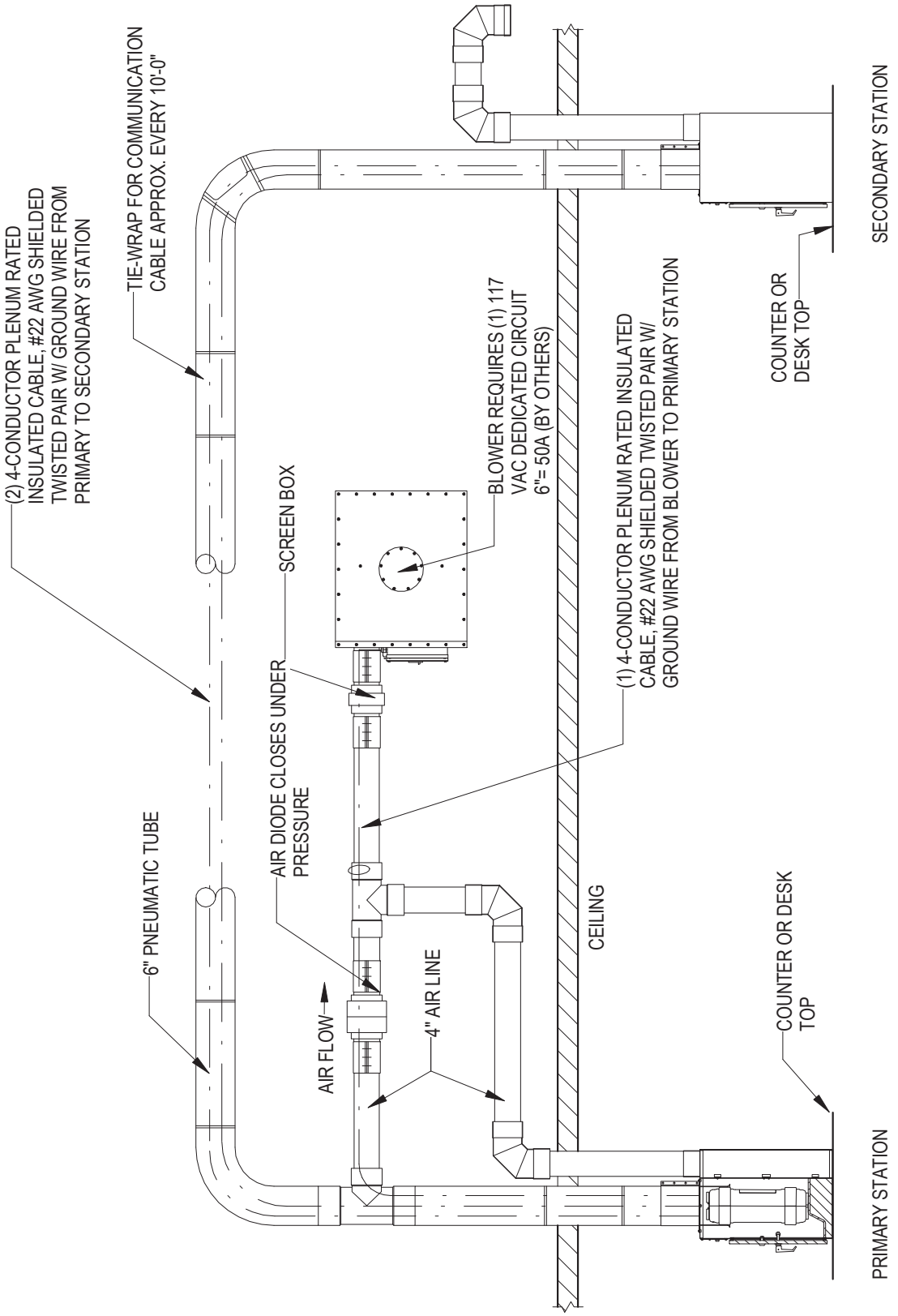

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	Not To Scale	6" Valet Point-to-Point	PT-8101

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Part 4 – Storage

Enviro-Control™ | KE2 Evaporator**Efficiency**

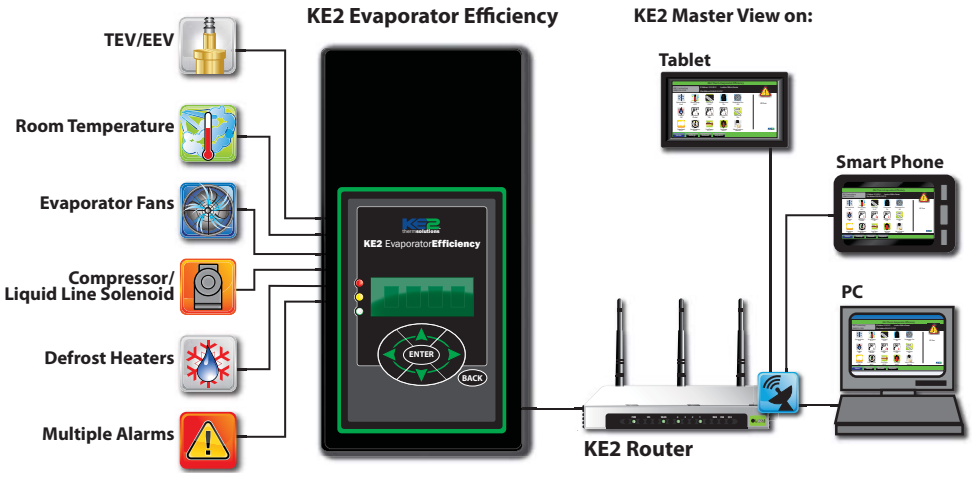
Installation Instructions

01/13 Rev. A 151627

Introduction

The KE2 Evaporator Efficiency (KE2 Evap) is an electronically operated evaporator controller engineered to save energy in refrigeration systems through precise control of superheat, space temperature, fan cycling, reducing compressor runtime, and implementing demand defrosts. The KE2 Evap offers quick payback, and a life expectancy that matches that of the system. The controller pays for itself, and then continues to pay dividends for the life of the system.

KE2 Evaporator Efficiency - Controls and Communicates



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Location

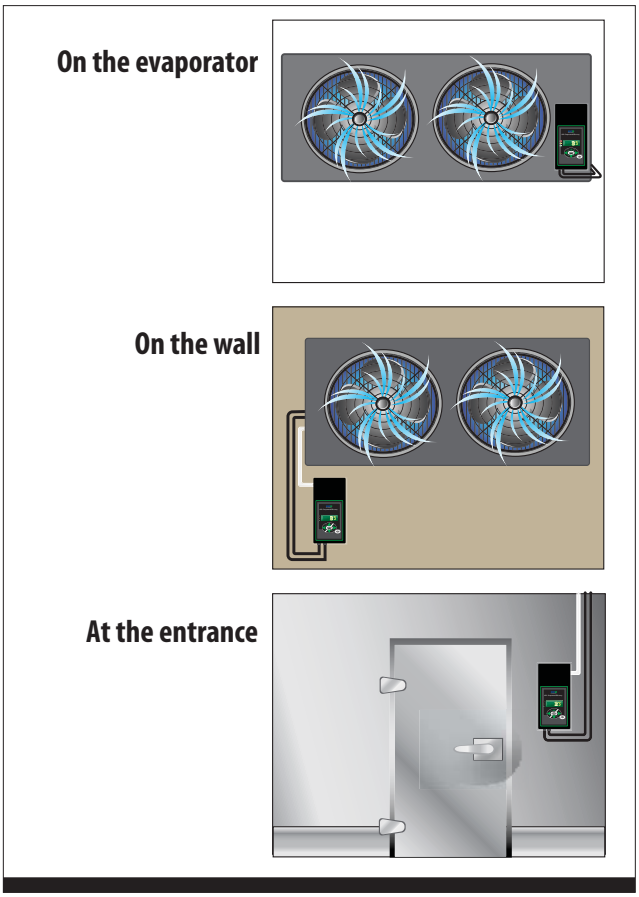
The KE2 Evap was developed with ease of installation in mind. The controller is supplied in an enclosure, and encapsulated to protect the circuitry from moisture damage. This extra level of protection allows the controller to be installed in the refrigerated space.

When installing the controller, it may either be installed on an interior/exterior wall or on the evaporator. Many evaporators have sufficient space to install the controller on the face of evaporator or on its housing. Locating the controller as close to the evaporator as possible reduces the amount of wiring when converting existing systems, as well as when it is applied on new applications.

Users may find it beneficial to install the controller in a location providing easy access -- on the wall or near the entrance. This enables the user to easily view the display, and eliminates the need to use a ladder or lift to modify the setpoints or check alarms.

If viewing the temperature outside the walk-in or refrigerated room is desirable, the KE2 Evap may be used as a digital thermostat. The controller is then installed near the door of the space for easy viewing of the room temperature and/or system status. See **Figure 1** for locations.

Figure 1 - KE2 Evap Installation Locations



If installing the controller on the face of the evaporator, preexisting knockouts on the evaporator should be used for installing the high voltage wiring. If knockouts do not preexist, hole(s) may be carefully cut into an unobstructed area of the evaporator case. If modifying the face of the evaporator is not feasible or desired, the controller's conduit knockouts may be used with ½ inch conduit.

The bottom side of the controller includes a cutout with cable tie slots providing a strain relief for the low voltage and sensor wires. Additional knockouts are available on either side if conduit is preferred.

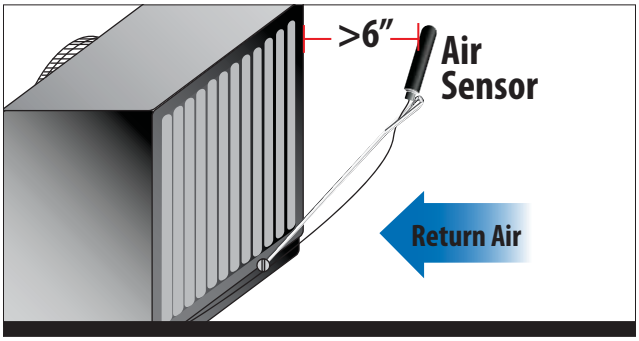
Installation & Wiring

The KE2 Evap is supplied with pluggable connectors for all connections. Pluggable connectors permit the controller to be placed in a safe location while the wiring is installed. They also simplify the wiring, allowing the wires to be fastened to the screw terminals in the open air. Once all wiring is completed using accepted wiring practices, it is plugged into the controller prior to final mounting.

Although there is one pressure transducer and four temperature sensor inputs, when used with mechanical valves (TEVs), KE2 Evap only requires the **(2) sensors supplied with the kit.** One sensor reads the return air temperature and the other measures the coil temperature. **NOTE! Sensor location is critical to the proper operation of the controller.**

Return Air Temperature Sensor - The air temperature sensor is installed in the return air of the evaporator using the included sensor mount. Most applications allow the sensor mount to be installed using an existing screw. On evaporators where using an existing screw is not possible, the included self-tapping screw may be used to secure the sensor mount to the evaporator. **Note: Be careful to avoid damage to an evaporator tube or causing a leak in the drip pan.** When installing, it is important to prevent the air sensor from coming into contact with the mounting bracket, cable ties, or any other solid material. **Figure 2** shows an example of how to mount the sensor. The sensor must be a minimum of 6 inches from the coil surface.

Figure 2 - Return Air Sensor Placement



After the sensor is installed, route the wire back to the controller location. When routing sensor wire, it is important to avoid interference from high voltage lines. If sensor wire is run parallel to the high voltage, there is a potential for inductance to affect the sensor reading. This is of particular concern with long wire runs. When extending sensors, use the 18 gage, shielded twisted pair. Sensor wires can be run beyond 100 feet when using special considerations. Contact KE2 Therm. After the wire has been successfully routed, it may be connected to the pluggable terminal on the controller.

Coil Temperature Sensor - As a critical input to the controller, it is essential the sensor is located at the **coldest point on the evaporator coil** for optimal operation. The coil sensor is an integral part of the control algorithm used to determine coil efficiency, to initialize defrosts, and to terminate defrosts.

KE2 Therm offers general guidance for sensor locations based on the coil construction. **Figure 3** shows the recommended locations for the coil sensor for each evaporator type.

When installing on draw through models, the sensor should be located behind the coil in the lower corner nearest the suction header. Blow through models should be installed on the front of the coil, in the upper corner also nearest to the suction header. When installing the sensor into the coil, the sensor should be positioned half way between the circuit tubes and, perpendicular to the face of the coil. When choosing the location, the sensor should not be located adjacent to the electric heating elements. Locating the sensor too close to the elements will cause false defrost termination temperatures. The sensor should be approximately half the distance between the heaters if possible. **Figure 4** shows the proper sensor placement.

Due to the many factors influencing the evaporator performance, it is impossible for KE2 Therm to provide the proper location of every installation. However, the coil sensor is an integral part of the control algorithm used to determine coil efficiency to initiate, as well as, terminate defrosts. The coldest point in the coil can be identified from existing system knowledge or by monitoring the normal operation.

Controller Power - The high voltage wiring is protected by a metal shield screwed to the back side of the controller. The shield should be removed to gain access to the wiring connections, making note of the location of the screws. The screws in the upper corners are coarse thread screws, while the screw in the middle is a 4-40 machine screw.

The controller accepts either 115V or 208/240V incoming power. The controller includes metal oxide varistors (MOVs), providing protection from voltage spikes. MOVs use the same technology commonly applied to protect consumer electronics. They function by filtering out voltages high enough to damage the board. When the voltage exceeds the allowed amount, the MOVs short to ground, protecting the circuitry. For additional protection, the board has a replaceable BK/MDL-1/4 fuse in line. The grey plug is accessible without removing the metal shield in the fuse

Figure 3 - Proper Sensor Location

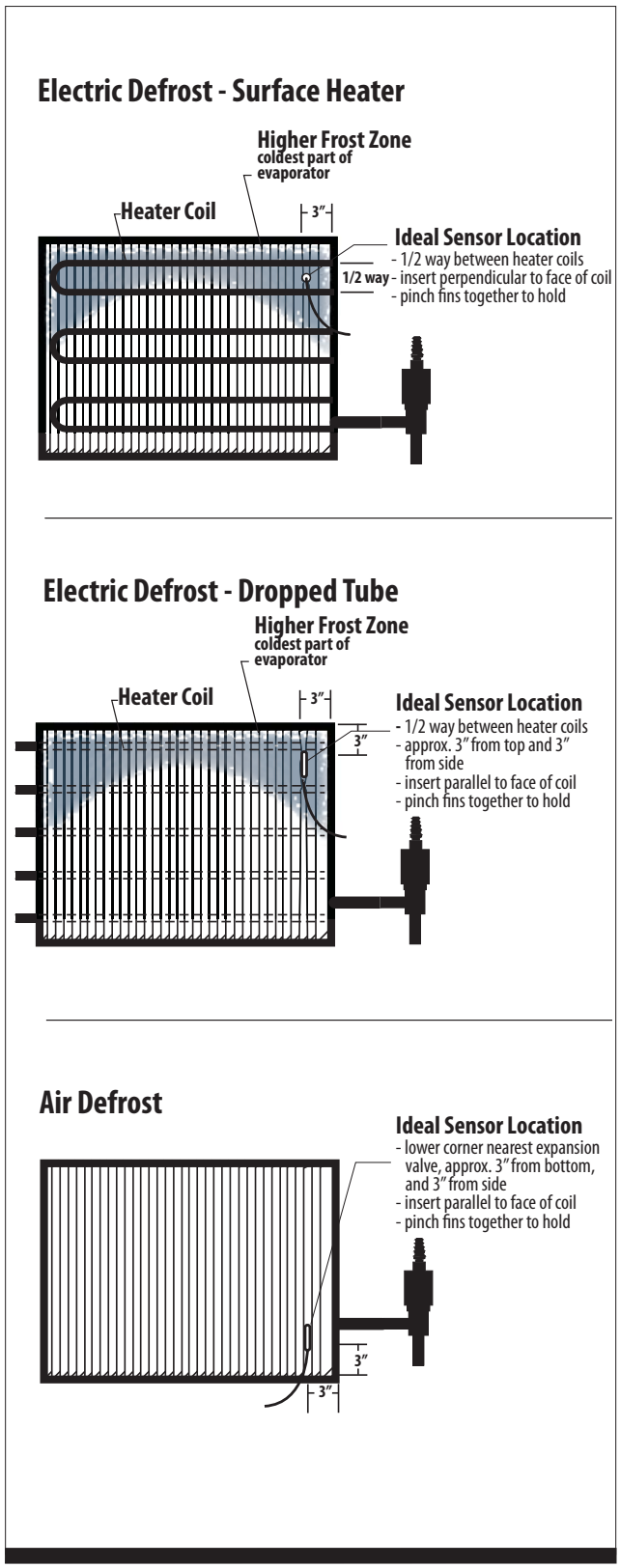
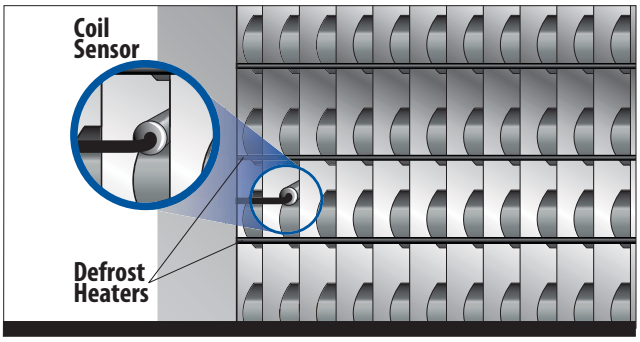


Figure 4 - Coil Sensor Placement



holder. Depress slightly and turn 1/4 turn counterclockwise to remove. Replace by depressing slightly and turning 1/4 turn clockwise. Do not overtighten.

The board uses a pluggable screw terminal connector to connect incoming power. The terminal is located in the top right corner of the controller when the terminals are facing the user. See **Figure 5**.

Fan and Defrost Relays - There are 2 larger relays on the controller with spade connectors. These are used for the evaporator fans and defrost heaters. Due to the spacing of the enclosure the spades require a 90 degree terminal. KE2 Therm has included (4) spade connectors to assist in wiring the relays.

Evaporator Fan Relay - The fan relay is rated 10A inductive at 240V. One leg of the incoming power for the fans should be connected to the COM terminal of the fan relay, the upper of the two larger relays. The remaining leg, (L2) should be connected to one lead of the fan. The remaining fan lead should be connected to the NO (Normally Open) terminal on the fan relay. See **Figure 7**.

Defrost Heater Relay - The heater relay is rated 20A resistive at 240V. One leg of the incoming power for the heaters should be connected to the COM terminal of the heater relay, the lower of the two larger relays. The remaining leg, (L2) should be connected to one lead of the heater. The remaining heater lead should be connected to the NO (Normally Open) terminal on the heater relay.

Compressor/Liquid Line Solenoid Relay - The compressor relay is rated at 3A induction at 240V. This relay uses the 3-position pluggable screw terminal to make the connection to the board. The relay is not intended to control the compressor directly. It is designed to be used to control the liquid line solenoid or as a pilot to the compressor contactor. One leg of the incoming power supply (L1) should be connected to COM terminal of the compressor relay, the upper of the two smaller relays. The remaining leg, (L2), should be connected to one lead on the solenoid/compressor contactor. The remaining lead, should be connected to the normally open (NO) position on the terminal.

Alarm Relay - The alarm relay is rated at 3A inductive at 240V. This relay uses the 3-position pluggable screw terminal to make the connection to the board. The relay may be used to connect an audible alarm, light, or to alert a 3rd party alarm system. One leg of the incoming power supply (L1) should be connected to COM terminal of the alarm relay, the lower of the two smaller relays. The remaining leg, (L2), should be connected to one lead on the alarm. The remaining alarm lead, should be connected to the normally open (NO) position on the terminal.

After all high voltage wiring is completed the metal shield must be replaced and screws tightened.

Additional Inputs

Suction Temperature Sensor - The suction temperature sensor is required when applying the controller with an electronic expansion valve. The sensor's proximity to the evaporator outlet differs slightly for electronically controlled valves from the placement of a TEV bulb. Due to the more refined control from an electronically controlled valve, the sensor must be placed as close to the outlet of the coil as feasible. Although the distance from the outlet is different, the nature of the refrigerant's flow through the tube remains unchanged, thus the orientation of the sensor remains at the 4 or 8 o'clock position. The sensor should be secured to the suction line using the included wire ties designed for low ambient operation.

Pressure Transducer - In addition to the suction temperature sensor, a pressure transducer is also required for superheat measurement when applying an electronic expansion valve. The pressure tap should be mounted on the top of a horizontal section of tube. It should be located near the suction sensor, approximately 3 inches downstream from the position of the temperature sensor.

Auxiliary Temperature Sensor -The auxiliary temperature sensor provides flexibility and may be used for any purpose desired by the user. The placement of the sensor is dependent on the requirements of the user's intended application. The Auxiliary Temperature sensor must be supplied by KE2 Therm.

Digital Inputs - The controller includes (3) digital inputs. See **Table 3** for configuration options.

Figure 5 - KE2 Evaporator Efficiency - Diagram (back view)

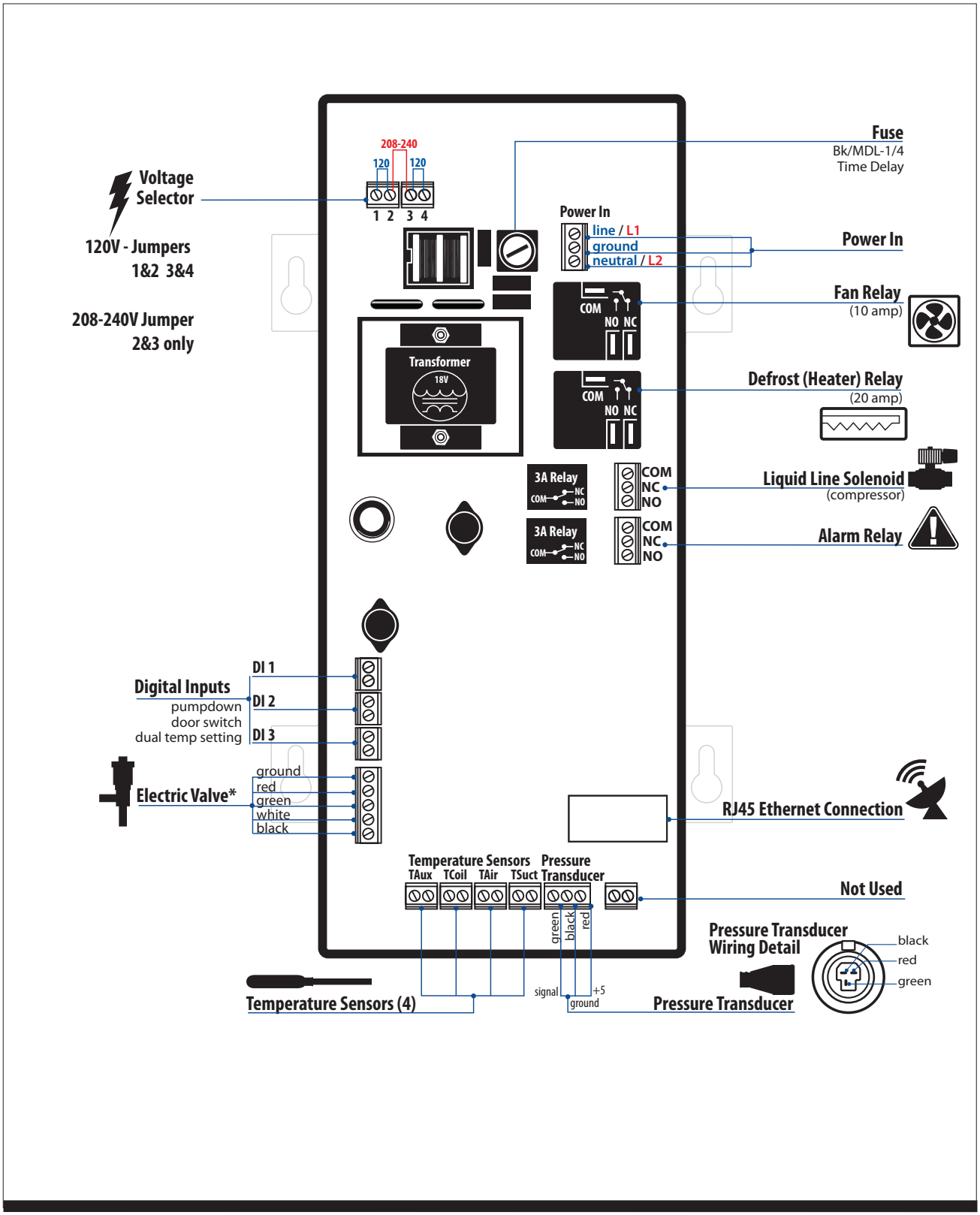
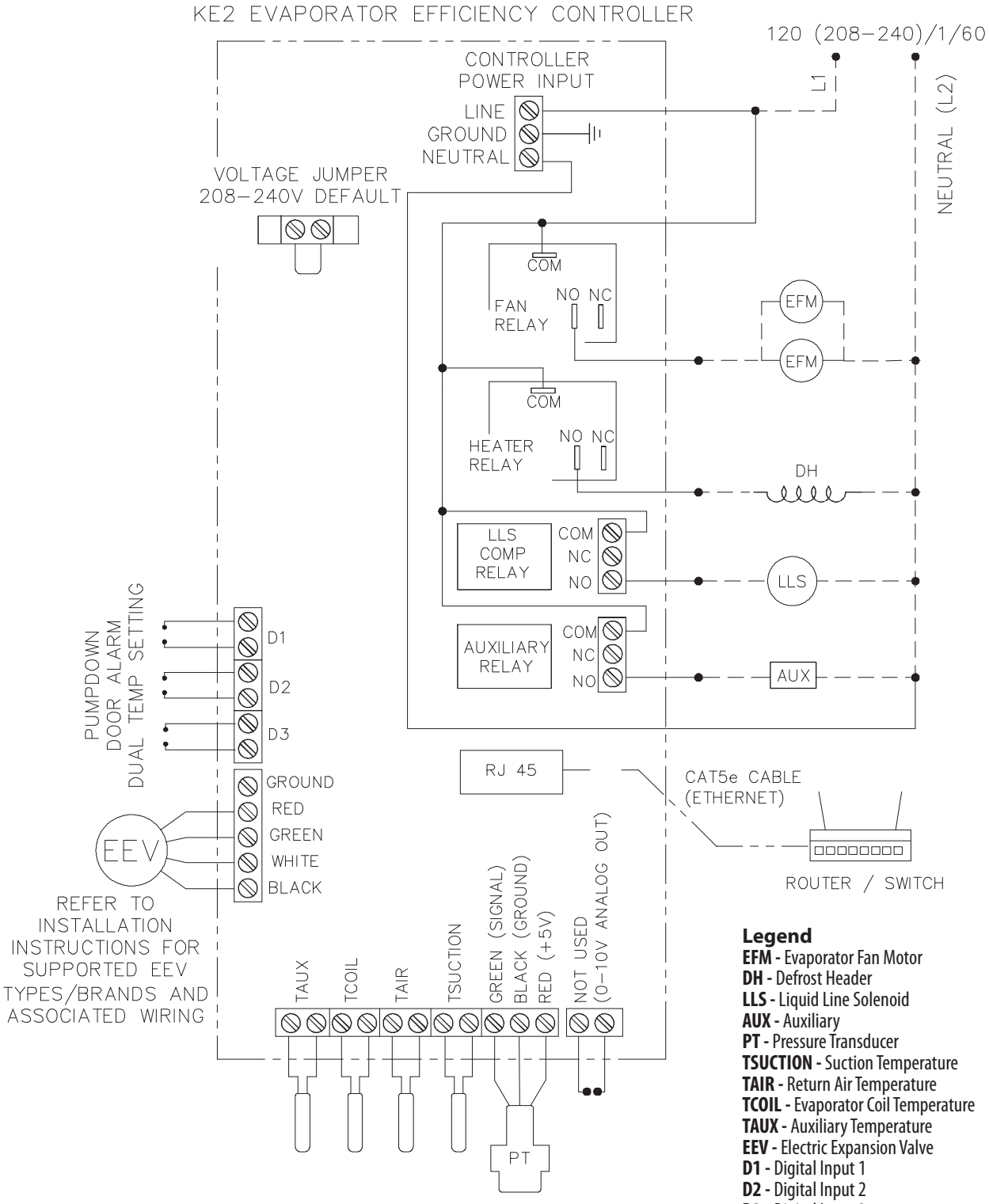


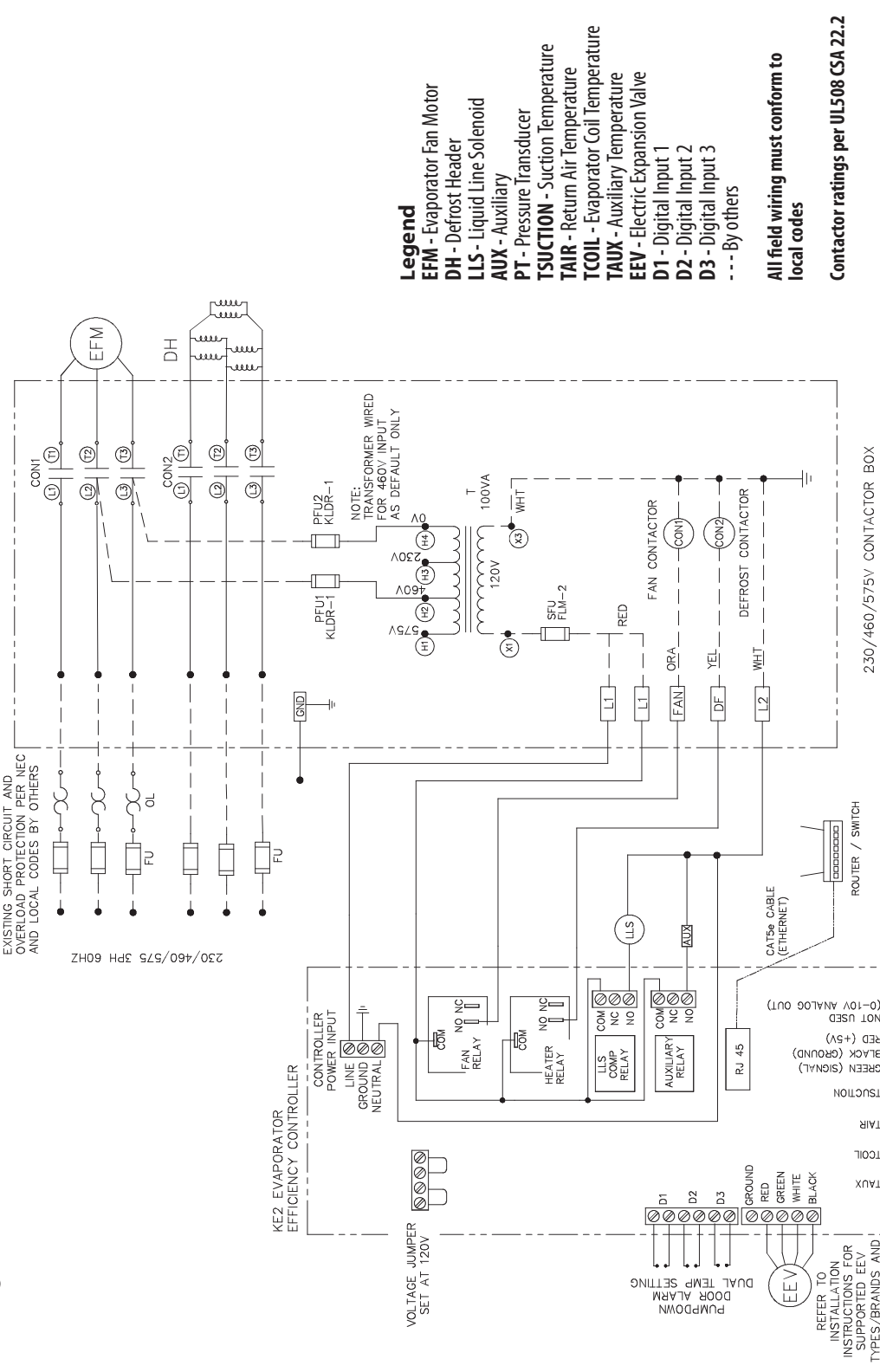
Figure 7 - Wiring Schematic - Controller New Install



Legend
EFM - Evaporator Fan Motor
DH - Defrost Header
LLS - Liquid Line Solenoid
AUX - Auxiliary
PT - Pressure Transducer
TSUCTION - Suction Temperature
TAIR - Return Air Temperature
TCOIL - Evaporator Coil Temperature
TAUX - Auxiliary Temperature
EEV - Electric Expansion Valve
D1 - Digital Input 1
D2 - Digital Input 2
D3 - Digital Input 3
- - - By others

All field wiring must conform to local codes

Figure 8 - Wiring Schematic - Controller with KE2 Contactor Box



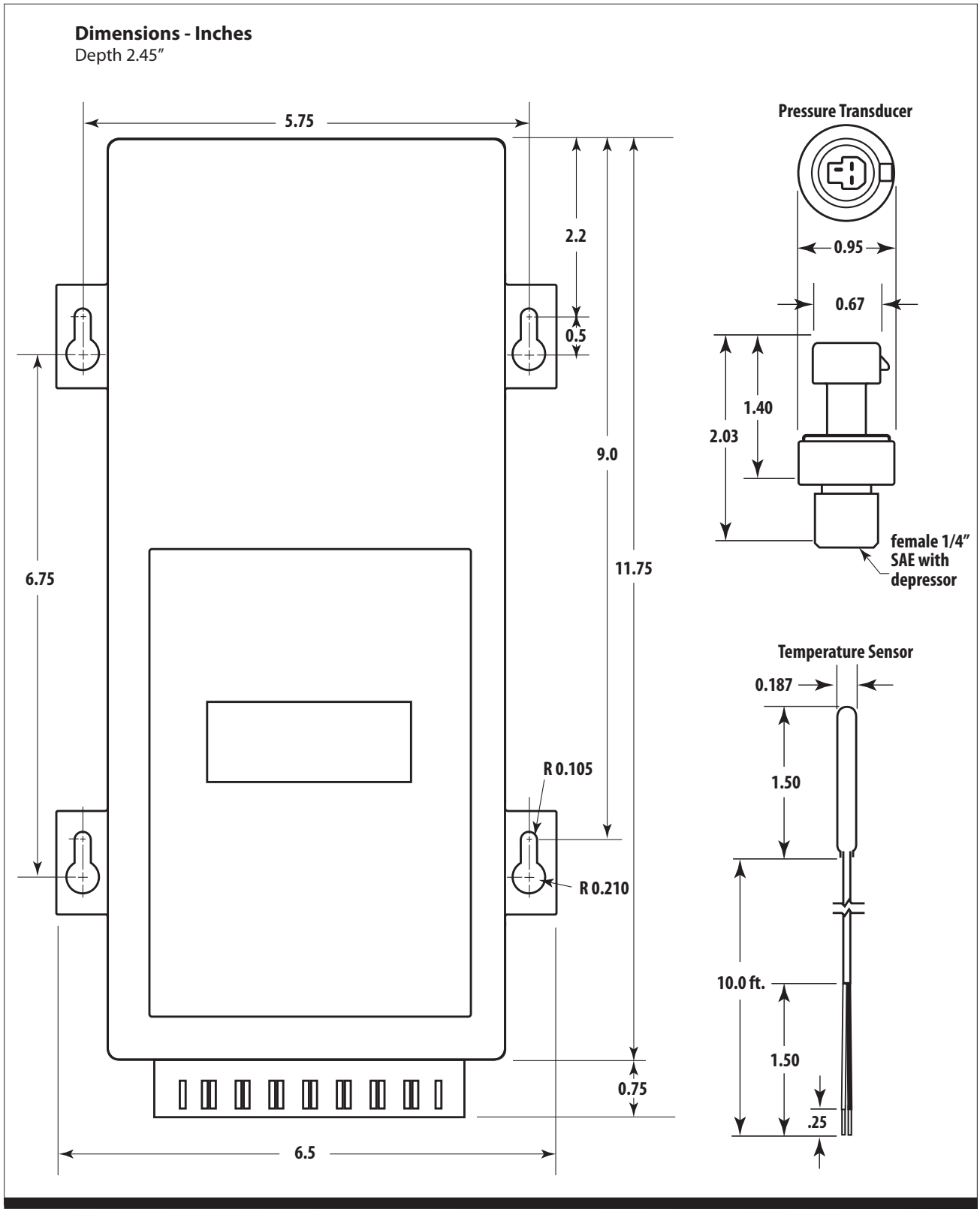
Evaporator Fan Motors
Con1 Max HP & Amp Ratings (Total All Fans)

Voltage	Max HP	Max AMPS
230 3Ø	15	42
460 3Ø	30	40
575 3Ø	30	32

Existing Defrost Heaters Max Current Ratings
(Amps are Total All Heaters)

Relay Box P/N	230V 3Ø	460V 3Ø	575V 3Ø
20217	54 Amps	52 Amps	52 Amps
20218	68 Amps	65 Amps	62 Amps
20219	80 Amps	77 Amps	62 Amps

Figure 9 - KE2 Evaporator Efficiency - Dimensions (front view)



Mounting the Controller

Once the wiring has been run to the controller location, the controller can be connected. When installing the KE2 Evaporator Efficiency, the (4) screws supplied in the kit may be preinstalled in the mounting surface. The controller has keyholes in each mounting tab to allow the controller to be installed over the screws. The mounting pattern can be seen in **Figure 9.**

User Interface

The KE2 Evap's onboard user interface uses a familiar 6-button arrangement to simplify navigation through the controller's menus. The menu has been grouped by category to provide an easy to program structure. By grouping the menu by each functional area, the user is not required to scroll though unrelated setpoints to access the desired functionality.

The **left** and **right arrows** move between the categories. When pressed while in a menu, the left and right arrows will move to the main screen or the adjacent menu.

The **up** and **down arrows** move the user through the available options for each group. All users are allowed access to the variable alarms. All other information is password protected to prevent unauthorized access to the controller's functionality.

The **ENTER** button is used to save an input option when it has been changed. **The enter button must be held for 3 seconds to prevent accidental changes.** Changes may be discarded by waiting, to allow the controller to timeout and return to default screen, or hitting the **BACK** button.

The BACK button is used to return to the previous screen. Pressing the BACK button twice at any time will return the user to the default view. **See Table 2 (following page).**

Controller Setup

Upon initially applying power to the controller, the controller will initialize, then automatically enter the **Quick Start Menu**. The Quick Start Menu consists of as little as 3 setpoints that must be configured for KE2 Evap to begin controlling the system.

Table 1 shows the Quick Start Menu. The first setpoint the user is asked to enter is the desired **ROOM TEMP**. This is followed by the **DEFROST TYPE**. The controller is designed to work with electric, hot gas, and off time defrosts. The last setpoint is the **VALVE TYPE**. The controller is defaulted to be used with a mechanical valve, but may be used with a variety of EEVs, including a customer defined valve.

These are the only setpoints required to begin controlling the system, when applied on a single evaporator with a mechanical valve, **See Table 1.**

Table 1 - Quick Start Menu

Mechanical Valve TEV 3 steps	Standard EEV 4 steps	Custom EEV 7 steps
Room Temp	Room Temp	Room Temp
Defrost Type	Defrost Type	Defrost Type
Valve Type	Valve Type	Valve Type
	Refrigerant	Refrigerant
		Motor Type (Unipolar/Bipolar)
		Motor Step Rate
		Max Valve Steps

If using a standard/predefined EEV, the user will also be prompted to specify the **REFRIGERANT**. The KE2 Evap may also be applied to user defined EEVs. When this option is selected, the user will be prompted to select **MOTOR TYPE**, **MOTOR STEP RATE**, and **MAX VALVE STEPS**. Once these have been set, the KE2 Evap will begin controlling EEV and the system. **Table 3**

Adjusting Controller Parameters

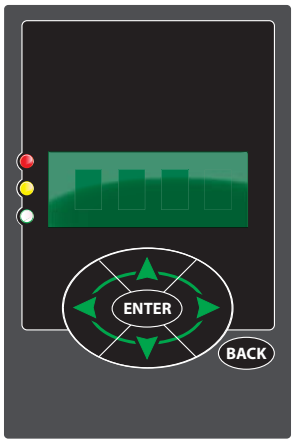
The controller has the ability to access an abundance of information from the 4-digit alphanumeric display. However, the controller requires a password, adding a degree of protection from unwanted modifications. The controller will prompt the user for a password **PASSWORD** when the user attempts to access setpoints they do not have permission to change.

Table 2 shows the menu structure of the controller. The default display of the controller always displays the actual room temperature. Pressing the **ENTER** button will display room temp **ROOM TEMP**. Pressing the **up** and **down** arrows moves the display through the **VARIABLES** menu. See **Table 2** By default, the controller only allows access to the room temperature. The **VARIABLES** menu consists of the current sensor readings and the relays' state. The **User Password (1111)** only provides access to the ROOM TEMP setpoint.

For the protection of the system, access to the **SETPOINT** and **MANUAL** control requires an **Installer Password (2222).** Pressing the right or left arrow will move from the Variables menu to the next menu, shown in **Table 2**, a complete list of parameters are shown in **Table 3.**

Pressing the **BACK** key at any time will return the user to next level up the menu. A second press will either return to the **Main Menu** or to the room temperature reading.

Table 2 - Navigation Through the Controller Menu and Menu Paramenters



Indicator lights
- **Red light** - critical alarm (system off)
- **Yellow light** - non-critical alarm (system running)
- **Green light** - compressor on
- **Green flashing** - compressor waiting on timer to start/stop

To move through controller menus:
- **Left Arrow and Right Arrow** Use to move between **Menus**
- **Up Arrow and Down Arrow** Scroll through **Menu Parameters**

To return to Main Menu: BACK Press BACK to return to the previous view.

To change settings: ENTER Press and hold ENTER for 3 seconds, when display begins blinking changes can be made

To save setting changes: ENTER Press and hold ENTER for 3 seconds to save change

Menus: **Menu Parameters:**

Non-adjustable

Variables (view only)
- ROOM TEMP
- COIL TEMP
- SYSTEM MODE
- SUPERHEAT
- SUCTION PRESSURE
- SUCTION TEMP
- SATURATION TEMP
- VALVE % OPEN
- AUX TEMP
- COMPRESSOR RELAY
- DEFROST RELAY
- FAN RELAY
- DIG 1 STATUS
- DIG 2 STATUS
- DIG 3 STATUS
- IP OCTET 1
- IP OCTET 2
- IP OCTET 3
- IP OCTET 4
- SUBNET MASK OCTET 1
- SUBNET MASK OCTET 2
- SUBNET MASK OCTET 3
- SUBNET MASK OCTET 4
- FIRMWARE VERSION

Variables for DIG IN Mode
- DIG IN MODE = DISABLED
- DIG IN MODE = 2ND (ROOM) TEMP
- DIG IN MODE = DOOR SWITCH
- DIG IN MODE = EXT ALARM
- DIG IN MODE = SYSTEM OFF
- DIG IN MODE = LIGHT SWITCH
- DIG IN MODE = CAMERA SWITCH

Alarms (view only)
- NO ALARM
- PRESSURE SENSOR
- SUCTION TEMP SENSOR
- AIR TEMP SENSOR
- COIL TEMP SENSOR
- AUX TEMP SENSOR
- HIGH SUPERHEAT
- LOW SUPERHEAT
- HIGH AIR TEMP
- LOW AIR TEMP
- EXCESS DEFROST
- DEFR TERM ON TIME
- DOOR SWITCH
- COMMUNICATION ERROR
- EXT ALARM

Setpoints*
- **ROOM TEMP**
- **DEFROST TYPE**
- **VALVE TYPE**
- *MOTOR TYPE*
- *MOTOR STEP RATE*
- *MAX VALVE STEPS*
- SUPERHEAT
- MAX OPERATING PRES
- REFRIGERANT
- AUX TEMP MODE
- AUX RELAY MODE
- MIN COMP RUN TIME
- MIN COMP OFF TIME
- REFRIG FAN MODE
- DEFROST MODE
- DEFROSTS / DAY
- 1ST DEFROST DELAY
- DEFROST FAN STATE
- DEFROST TERM TEMP
- DEFROST PARAMETER
- DRAIN TIME
- COMP RUN TIME
- ELEC DEFROST MODE
- FAN DELAY TEMP
- MAX FAN DELAY TIME
- PUMP DOWN TIME
- ***MULTI AIR TEMP CTRL***
- ***MULTI EVAP COOL***
- ***MULTI EVAP DEFROST***
- MULTI EVAP SENSOR
- HIGH TEMP ALARM OFFSET
- HIGH TEMP ALARM DELAY
- LOW TEMP ALARM OFFSET
- LOW TEMP ALARM DELAY
- DOOR ALARM DELAY
- DIG IN 1 MODE
- DIG IN 1 STATE
- DIG IN 2 MODE
- DIG IN 2 STATE
- DIG IN 3 MODE
- DIG IN 3 STATE
- 2ND ROOM TEMP
- SUCT PRES OFFSET
- SUCT TEMP OFFSET
- AIR TEMP OFFSET
- COIL TEMP OFFSET
- AUX TEMP OFFSET
- TEMP UNITS
- AIR TEMP DIFF
- EXTREME TEMP DIFF

Manual
- MANUAL CONTROL
- MANUAL VALVE
- CLEAR ALARMS
- MANUAL COMPRESSOR RELAY
- MANUAL DEFROST RELAY
- MANUAL FAN RELAY
- DHCP
- FACTORY RESET

* The Setpoint paramenters shown in **BOLD** (Valve Type, Room Temp Setpoint and Defrost Mode) need to be set by the user prior to start up. The other Setpoint Parameters can also be adjusted, however the factory setpoints are generally correct for most applications.

The Setpoint parameters shown in *ITALIC* are only displayed when an EEV is used.

The Setpoint parameters shown in ***BOLD ITALIC*** are displayed for bonded controllers only.

Enviro-Control™ Factory Default Settings

Electric Defrost Factory Settings (freezer applications)		Air Defrost Factory Settings (cooler applications)	
PARAMETER	**SETTING**	**PARAMETER**	**SETTING**
ROOM TEMP	-10.0°F	ROOM TEMP	36.0°F
DEFROST TYPE	ELEC	DEFROST TYPE	AIR
VALVE TYPE	CUSTOM	VALVE TYPE	CUSTOM
MOTOR TYPE	BIPOLAR	MOTOR TYPE	BIPOLAR
MOTOR STEP RATE	50 steps/sec	MOTOR STEP RATE	50 steps/sec
MAX VALVE STEPS	480 steps	MAX VALVE STEPS	480 steps
SUPER HEAT	8°F	SUPER HEAT	8°F
MAX OPERATING PRESSURE	150 psig	MAX OPERATING PRESSURE	150 psig
REFRIGERANT	404A	REFRIGERANT	404A
AUX TEMP MODE	2ND COIL TEMP	AUX TEMP MODE	2ND COIL TEMP
AUX RELAY MODE	ALARM RELAY	AUX RELAY MODE	ALARM RELAY
MIN COMP RUN TIME	2 minutes	MIN COMP RUN TIME	2 minutes
MIN COMP OFF TIME	5 minutes	MIN COMP OFF TIME	5 minutes
REFRIG FAN MODE	ON WITH COMPRESSOR	REFRIG FAN MODE	ON WITH COMPRESSOR
DEFROST MODE	DEMAND	DEFROST MODE	DEMAND
DEFROSTS / DAY	5	DEFROSTS / DAY	5
1ST DEFROST DELAY	120 minutes	1ST DEFROST DELAY	120 minutes
DEFROST FAN STATE	OFF	DEFROST FAN STATE	ON
DEFROST TERM TEMP	50°F	DEFROST TERM TEMP	50°F
DEFROST PARAMETER	25 minutes	DEFROST PARAMETER	15 minutes
DRAIN TIME	2 minutes	DRAIN TIME	2 minutes
COMP RUN TIME	6 hours	COMP RUN TIME	6 hours
ELEC DEFROST MODE	PULSE	ELEC DEFROST MODE	PULSE
FAN DELAY TEMP	20°F	FAN DELAY TEMP	20°F
MAX FAN DELAY TIME	2 minutes	MAX FAN DELAY TIME	2 minutes
PUMP DOWN TIME	2 minutes	PUMP DOWN TIME	2 minutes
MULTI AIR TEMP CTRL	WARMEST	MULTI AIR TEMP CTRL	WARMEST
HIGH TEMP ALARM OFFSET	10°F	HIGH TEMP ALARM OFFSET	10°F
HIGH TEMP ALARM DELAY	60 minutes	HIGH TEMP ALARM DELAY	60 minutes
LOW TEMP ALARM OFFSET	4°F	LOW TEMP ALARM OFFSET	4°F
LOW TEMP ALARM DELAY	10 minutes	LOW TEMP ALARM DELAY	10 minutes
DOOR ALARM DELAY	30 minutes	DOOR ALARM DELAY	30 minutes
DIG IN 1 MODE	DOOR	DIG IN 1 MODE	DOOR
DIG IN 1 STATE	CLOSED	DIG IN 1 STATE	CLOSED
DIG IN 2 MODE	DISABLED	DIG IN 2 MODE	DISABLED
DIG IN 2 STATE	CLOSED	DIG IN 2 STATE	CLOSED
DIG IN 3 MODE	DISABLED	DIG IN 3 MODE	DISABLED
DIG IN 3 STATE	CLOSED	DIG IN 3 STATE	CLOSED
2ND ROOM TEMP	-50°F	2ND ROOM TEMP	-50°F
SUCT PRES OFFSET	0.0 psig	SUCT PRES OFFSET	0.0 psig
SUCT TEMP PFFSET	0.0°F	SUCT TEMP PFFSET	0.0°F
AIR TEMP OFFSET	0.0°F	AIR TEMP OFFSET	0.0°F
COIL TEMP OFFSET	0.0°F	COIL TEMP OFFSET	0.0°F
AUX TEMP OFFSET	0.0°F	AUX TEMP OFFSET	0.0°F
TEMP UNITS	FAHRENHEIT	TEMP UNITS	FAHRENHEIT
AIR TEMP DIFF	1°F	AIR TEMP DIFF	1°F

Table 3 - Controller Menus and Menu Parameters

Manual Menu

Parameter Name	Description	Range	Default
MANUAL CONTROL	Force the controller into the next operating mode	REFRIGERATE, OFF, DEFROST, DRIP TIME, FAN DELAY	
MANUAL VALVE	Manually open or close the EEV in percentage increments	1% increment	
CLEAR ALARMS	Clear all active alarms		
MANUAL COMPRESSOR RELAY	Manually energize or de-energize liquid line solenoid /compressor relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
MANUAL DEFROST RELAY	Manually energize or de-energize defrost relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
MANUAL FAN RELAY	Manually energize or de-energize evaporator fan relay	AUTO (ON/OFF), MANUAL OFF, MANUAL ON	AUTO
DHCP	ADVANCED TOPIC, SEE USER GUIDE: Selects appropriate DHCP mode	OFF, CLIENT, SERVER	OFF
FACTORY RESET	Reset the controller to the factory default setpoints	RESET	

Variables Menu - Non Adjustable (view only)

Parameter Name	Description
ROOM TEMP	Room temperature as measured by the controller
COIL TEMP	Coil temperature as measured by the controller
SYSTEM MODE	Current operating status
SUPERHEAT	Superheat as calculated by the controller (requires suction pressure transducer and suction temperature sensor)
SUCTION PRESSURE	Suction pressure as measured by the controller
SUCTION TEMP	Suction temperature as measured by the controller
SATURATION TEMP	Saturation temperature as calculated by the controller
VALVE % OPEN	Percentage the EEV is open
AUX TEMP	Auxiliary Temperature (Taux) sensor reading as measured by the controller
COMPRESSOR RELAY	Current state of liquid line solenoid/compressor relay
DEFROST RELAY	Current state of the defrost relay
FAN RELAY	Current state of the evaporator fan relay
DIG 1 STATUS	Current status of the Digital Input #1
DIG 2 STATUS	Current status of the Digital Input #2
DIG 3 STATUS	Current status of the Digital Input #3
IP OCTET 1	The first three digits of the IP address
IP OCTET 2	The second three digits of the IP address
IP OCTET 3	The third three digits of the IP address
IP OCTET 4	The fourth three digits of the IP address
SUBNET MASK OCTET 1	The first three digits of the subnet mask address
SUBNET MASK OCTET 2	The second three digits of the subnet mask address
SUBNET MASK OCTET 3	The third three digits of the subnet mask address
SUBNET MASK OCTET 4	The fourth three digits of the subnet mask address
FIRMWARE VERSION	Current version of the firmware on the controller

Variables Menu Options for DIG IN MODE

DIG IN Setting	Status Displayed on Controller
DIG IN MODE = DISABLED	DISABLED
DIG IN MODE = 2ND (ROOM) TEMP	inactive = 2ND ROOM TEMP OFF; active = 2ND ROOM TEMP ON
DIG IN MODE = DOOR SWITCH	inactive = DOOR CLOSED; active = DOOR OPEN
DIG IN MODE = EXT ALARM	inactive = NO ALARM; active = EXT ALARM (x)
DIG IN MODE = SYSTEM OFF	inactive = SYSTEM ON; active = SYSTEM OFF
DIG IN MODE = LIGHT SWITCH	inactive = LIGHTS OFF; active = LIGHTS ON
DIG IN MODE = CAMERA SWITCH	inactive = CAMERA OFF; active = CAMERA ON

Alarms Status Menu Non Adjustable (view only)

Parameter Name	Description
NO ALARM	No alarms active, everthing is running correctly
PRESSURE SENSOR	Suction pressure sensor is shorted, open or pressure out of range
SUCTION TEMP SENSOR	Suction temperature sensor is shorted or open
AIR TEMP SENSOR	Return air temperature sensor is shorted or open
COIL TEMP SENSOR	Coil temperature sensor is shorted or open
AUX TEMP SENSOR	Auxiliary temperature sensor is shorted or open
HIGH SUPERHEAT	Superheat above upper limit
LOW SUPERHEAT	Superheat below lower limit
HIGH AIR TEMP	Room temperature is above **ROOM TEMP + AIR TEMP DIFF + HIGH TEMP ALARM OFFSET** for longer than **HIGH TEMP ALARM DELAY**
LOW AIR TEMP	Room temperature is below **ROOM TEMP - LOW TEMP ALARM OFFSET** for longer than **LOW TEMP ALARM DELAY**
EXCESS DEFROST	Three consecutive defrosts with less than a one hour interval between each defrost
DEFR TERM ON TIME	Defrost terminated on time instead of temperature for two consecutive cycles
DOOR SWITCH	If door is open and room temperature is 5 degrees above **ROOM TEMP + AIR TEMP DIFF** for **DOOR ALARM DELAY** time
COMMUNICATION ERROR	ONLY FOR BONDED CONTROLLERS: No communication between controllers for one minute or more
EXT ALARM	If **DIG IN** (**1, 2** and/or **3**) **MODE** = EXT ALARM: The digital input is in an active state

Setpoints Menu

	Parameter Name	Description
	ROOM TEMP	Room temperature to be maintained
	DEFROST TYPE	Method of defrost used on the evaporator coil: Electric, Air, Hot Gas with Liquid Line Solenoid/Compressor relay off, Hot Gas with Liquid Line Solenoid/compressor relay on
	VALVE TYPE	Type of valve used on the system: mechanical, pre-configured electric, custom EEV configuration
Custom EEV Only	**MOTOR TYPE**	If **VALVE TYPE** = CUSTOM: The motor type used in the valve
Custom EEV Only	**MOTOR STEP RATE**	If **VALVE TYPE** = CUSTOM: The motor speed setting in number of steps per second
Custom EEV Only	**MAX VALVE STEPS**	If **VALVE TYPE** = CUSTOM: The total number of steps required to move the valve from closed to fully open
	SUPERHEAT	The superheat value that the controller will maintain, (not applicable if **VALVE TYPE** = MECHANICAL)
	MAX OPERATING PRES	The maximum allowable suction pressure, (not applicable if **VALVE TYPE** = MECHANICAL)
	REFRIGERANT	The type of refrigerant used in the refrigeration system
	AUX TEMP MODE	Configuration mode of the auxiliary temperature sensor
	AUX RELAY MODE	Configuration mode of the auxiliary relay.
	MIN COMP RUN TIME	Minimum amount of time the liquid line solenoid/compressor relay must remain on after it is energized
	MIN COMP OFF TIME	Minimum amount of time the liquid line solenoid/compressor relay must remain off before it can be energized again.
	REFRIG FAN MODE	Fan operation while in refrigeration mode
	DEFROST MODE	The method the controller uses to determine when to initiate a defrost.
	DEFROSTS / DAY	If **DEFROST MODE** = SCHEDULED: The number of evenly spaced defrosts per day the controller will initiate.
	1ST DEFROST DELAY	If **DEFROST MOD**E = SCHEDULED: The amount of time from controller power up until the first defrost is initiated.
	DEFROST FAN STATE	Whether or not to run the evaporator fans during defrost
	DEFROST TERM TEMP	The temperature the coil sensor(s) must exceed in order to terminate defrost. The defrost relay is de-energized at this point.
	DEFROST PARAMETER	The maximum amount of time the defrost relay will be energized.
	DRAIN TIME	Time to be in drain mode (drip time)
	COMP RUN TIME	If **DEFROST MODE** = RUN TIME: The amount of time liquid line solenoid/compressor relay is energized before the next defrost is initiated.
	ELEC DEFROST MODE	If **DEFROST TYPE** = ELEC: Whether to leave the defrost relay energized during the defrost cycle or to utilize advanced defrost algorithm.
	FAN DELAY TEMP	After defrost, the coil sensor reading must fall below this temperature set point in order for the controller to resume normal fan operation.
	MAX FAN DELAY TIME	Maximum amount of time after defrost to resume normal fan operation.
	PUMP DOWN TIME	Minimum amount of time between de-energizing the liquid line solenoid/compressor relay and energizing the defrost relay.
	MULTI AIR TEMP CTRL	Select control method to use with multiple room temperature sensors
Bonded Controllers Only	**MULTI EVAP COOL**	Select type of multi evaporator control - options are synchronous or independent
Bonded Controllers Only	**MULTI EVAP DEFROST**	Select whether to have all bonded controllers initiate defrost mode at the same time or independently.
Bonded Controllers Only	**MULTI EVAP SENSOR**	Select whether or not to share room temperature, coil temperature and suction pressure sensor data with bonded controllers.
	HIGH TEMP ALARM OFFSET	The number of degrees above **ROOM TEMP** for a **HIGH TEMP ALARM** condition.
	HIGH TEMP ALARM DELAY	Minutes the room temperature must remain above **ROOM TEMP + HIGH TEMP ALARM OFFSET** before issuing a **HIGH TEMP ALARM**
	LOW TEMP ALARM OFFSET	The number of degrees below **ROOM TEMP** for a **LOW TEMP ALARM** condition.
	LOW TEMP ALARM DELAY	Minutes the room temperature must remain below **ROOM TEMP - LOW TEMP ALARM OFFSET** before issuing a **LOW TEMP ALARM**
	DOOR ALARM DELAY	If **DIG IN (1, 2** and/or **3**) **MODE** = DOOR SWITCH: The amount of time, in minutes, before an alarm condition is initiated if door is open and room temperature is 5 degrees above **ROOM TEMP + AIR TEMP DIFF**
	DIG IN 1 MODE	Sets the function of the digital input
	DIG IN 1 STATE	Sets whether the switch activates when opened or closed
	DIG IN 2 MODE	Sets the function of the digital input
	DIG IN 2 STATE	Sets whether the switch activates when opened or closed
	DIG IN 3 MODE	Sets the function of the digital input
	DIG IN 3 STATE	Sets whether the switch activates when opened or closed
	2ND ROOM TEMP	If **DIG IN (1, 2** and/or **3**) **MODE** = 2ND ROOM TEMP: This value becomes the **ROOM TEMP** setpoint when the digital input is active
	SUCT PRES OFFSET	An offset added or subtracted from the suction line pressure transducer reading to calibrate, if needed
	SUCT TEMP OFFSET	An offset added or subtracted from the suction temperature sensor reading to calibrate, if needed
	AIR TEMP OFFSET	An offset added or subtracted from the room temperature sensor reading to calibrate, if needed
	COIL TEMP OFFSET	An offset added or subtracted from the coil temperature sensor reading to calibrate, if needed
	AUX TEMP OFFSET	An offset added or subtracted from the auxiliary temperature sensor reading to calibrate, if needed
	TEMP UNITS	Units for temperature's display in °F or °C
	AIR TEMP DIFF	The number of degrees above **ROOM TEMP** before the controller will go into **REFRIGERATION** mode
	EXTREME TEMP DIFF	ADVANCED TOPIC: Call KE2 Therm for assistance

	Range	Default	Current
	-50°F to 90°F	-10°F	
	ELEC, AIR, HOT GAS COMP ON, HOT GAS COMP OFF	ELEC	
	MECHANICAL, KE2, SER/SEI 1 TO 20, SER B TO L, SEI 30, SEI 50, SEH, ETS12 TO 50, ETS100, ETS250/400, KV, CAREL, CUSTOM;	MECHANICAL	
	BIPOLAR, UNIPOLAR	BIPOLAR	
	30 to 400 steps/second	200 steps	
	200 to 6400 steps	1600 steps	
	5°F to 30°F	8°F	
	10 to 150 psig	150 psig	
	404A, R507, 407A, 407C, 422A, 422D, 134A, R22, R717, 438A, 408A, 409A, 410A,	404A	
	DISABLED, MONITOR, 2ND AIR TEMP, 2ND COIL TEMP	DISABLED	
	ALARM RELAY, 2 SPEED FAN CTL, 2ND COMP RELAY, 2ND FAN RELAY, 2ND DEFR RELAY, LIGHT RELAY, CAMERA RELAY	ALARM RELAY	
	0 to 15 minutes	2 minutes	
	0 to 15 minutes	5 minutes	
	ON WITH COMPRESSOR, PERMANENT, CYCLE	ON WITH COMPRESSOR	
	DEMAND, SCHEDULED, RUN TIME	DEMAND	
	0 to 8	5	
	0 to 240 minutes	120 minutes	
	ON/OFF	OFF if **DEFROST TYPE** = ELEC, HOT GAS COMP ON, HOT GAS COMP OFF ON if **DEFROST TYPE** = AIR	
	35°F to 90°F	50°F if **DEFROST TYPE** = ELEC, HOT GAS COMP ON, HOT GAS COMP OFF 40°F if **DEFROST TYPE** = AIR	
	0 to 90 minutes	25 minutes if **DEFROST TYPE** = ELEC 10 minutes if **DEFROST TYPE** = HOT GAS COMP ON, HOT GAS COMP OFF 40 minutes if **DEFROST TYPE** = AIR	
	0 to 15 minutes	2 minutes	
	0 to 24 hours	6 hours	
	PULSE, PERMANENT	PULSE	
	-40°F to 35°F	20°F	
	0 to 20 minutes	2 minutes	
	0 to 10 minutes	0 minutes	
	AVERAGE, WARMEST	WARMEST	
	SYNC, INDEPENDENT	SYNC	
	SYNC, INDEPENDENT	SYNC	
	SHARED, NOT SHARED	SHARED	
	0°F to 99.9°F	10°F	
	0 to 120 minutes	60 minutes	
	0°F to 20°F	4°F	
	0 to 30 minutes	10 minutes	
	0 to 180 minutes	30 minutes	
	DISABLED, 2ND ROOM TEMP, DOOR SWITCH, EXT ALARM, SYSTEM OFF	DOOR	
	OPEN, CLOSED	CLOSED	
	DISABLED, 2ND ROOM TEMP, DOOR SWITCH, EXT ALARM, SYSTEM OFF	DISABLED	
	OPEN, CLOSED	CLOSED	
	DISABLED, 2ND ROOM TEMP, DOOR SWITCH, EXT ALARM, SYSTEM OFF, LIGHT SWITCH, CAMERA SWITCH	DISABLED	
	OPEN, CLOSED	CLOSED	
	-50°F to 90°F	-50°F	
	-5.0 to 5.0 psig	0.0 psig	
	-5.0°F to 5.0°F	0.0°F	
	-5.0°F to 5.0°F	0.0°F	
	-5.0°F to 5.0°F	0.0°F	
	-5.0°F to 5.0°F	0.0°F	
	FAHRENHEIT/CELSIUS	FAHRENHEIT	
	0°F to 25°F	1°F	

Table 4 - Defrost Defaults

Setpoint	Electric	Air	Hot Gas
Defost Fan State:	Off	On	Off
Defrost Termination Temperature Setpoint:	50	40	50
Maximum Defrost Time	30	45	15
Electric Defrost Mode:	Pulse	Permanent	Permanent

Communication

The KE2 Evap uses standard TCP/IP communication. The controller is equipped with an RJ-45 female connector to connect to Ethernet cable.

To communicate with the controller, the user will use a web browser to see the KE2 MasterView. The information is stored on the controller, so special software is not required.

A standard Ethernet cable should be used between the peripheral device and the controller. One end is connected to the controller, and the other to the Ethernet port on the PC or MasterView. The Ethernet port will look similar to a telephone jack. The difference is the Ethernet port is larger with 8 wires instead of 6.

In installations where multiple evaporators are piped to a single condenser, networking the controllers is required. This prevents damage to the system by synchronizing the defrost cycles. Networked controllers have an additional safety layer to protect the system. When networked, the controllers share information, such as air temperature, to allow a controller in alarm mode to continue to provide refrigeration until the system is serviced.

When networking multiple controllers an ethernet switch or router is required. KE2 Network Router is available in a 4-port and KE2 Switch in an 8-port model. The KE2 Router includes wireless access. The 8-port switch should be used for larger networks. Multiple switches can be ganged together to create additional ports for the network. When necessary, the local Network Adminstrator should be contacted to facilitate the network installation.

Table 5 - Ethernet Specifications Summary

Specifications	Ethernet - Unshielded Twisted Pair (UTP)
Topology	star
Network Friendly	YES
Maximum Cable Length	330 feet (copper)
Maximum Data Rate	1,000 mbs
Native Internet	YES
Supported Devices	thousands
Response Time	milliseconds

For additional information on Ethernet Cable, consult IEEE 802.

Table 6 - Specifications

Controller	
Input Voltage:	120V or 208 - 240V
Ambient Temp:	-40° to 140°F
Operating Temp:	-40° to 140°F
Display:	4-digit alphanumeric LED
IP Rating:	IP65
Inputs:	(4) temperature sensors (KE2 SKU 20200)
	(1) pressure transducer (KE2 SKU 20204)
Valve Types:	unipolar and bipolar stepper motors (12V) (Beacon® is 21V)
Relays:	20A resistive (defrost) 10A inductive (evaporator fan)
	(2) 3A inductive rated cycles
Digital Input 1 & 2:	door contact, use 2nd air temp setpoint, disabled, system off, external alarm notification
Digital Input 3	door contact, use 2nd air temp setpoint, disabled, system off, external alarm notification, **lights, camera**
Communication:	Standard TCP/IP
Pressure Transducer	
Pressure Range:	0 to 150 psia
Proof Pressure:	450 psi
Burst Pressure:	1500 psi
Operating Temp:	-40° to 275°F
Temperature Sensor	
Sensor Specs:	-60° to 150°F moisture resistant package

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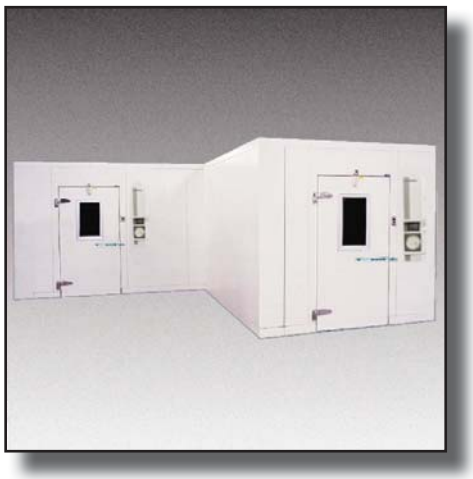
Environmental Rooms and Stability Chambers

A wide selection of temperature and humidity controls custom designed to meet your needs.



NORLAKE SCIENTIFIC®

Committed to our environment

ENVIRONMENTAL ROOMS / STABILITY CHAMBERS

SPECIFICATIONS

Controlled Temperature Chambers - Stability Rooms

Environmental Rooms/Stability Chambers from Nor-Lake Scientific reproduce and closely monitor any environment with a precise combination of humidity, temperature and light. Choose a multi-temperature or constant temperature room. Environmental rooms are customized to meet your testing and storage needs.

Options

- Microprocessor based controls with accuracies to +/-0.15°C
- Optional Humidification/ Dehumidification/Lighting
- Modular construction for ease of installation and relocation
- Alarms, monitors, temperature recorders and other performance options
- LED lighting

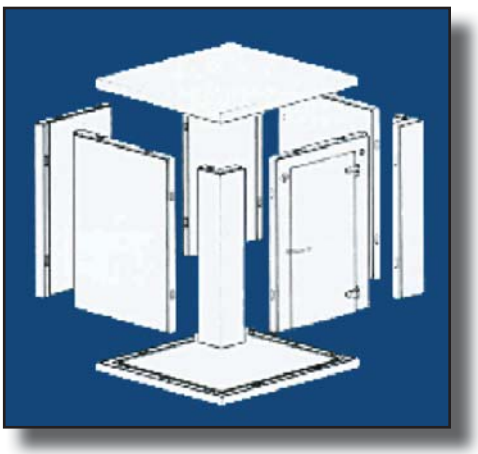
Multiple Applications

- Pharmaceutical Research and Development
- Drug Stability and Shelf Life Testing
- Plasma and Blood Storage
- Clinical Research
- Environment Simulation Testing
- Working Laboratories
- Biological Research
- Electronic Stress Testing

Modular Construction

Nor-Lake Scientific rooms are constructed using 100% foamed-in-place polyurethane insulation expanded with HFC-245fa which is CFC and HCFC free. The foam is bonded by an adhesive to the interior and the exterior metal pan skins and heat cured for life long stability. The “R” value of the panels shall be a minimum of 25 for coolers and 32 for freezers.

The panel joints are precisely formed using male and female tongue and groove with complete perimeter gasketing and cam action fasteners to provide a tight seal. The construction meets the UL flame spread rating and NSF sanitation approvals. The rooms can be provided in a variety of metal types and finishes. Nor-Lake Scientific will construct a room of any size to meet your needs.



SPECIFICATIONS

Controls

A fully programmable microprocessor with a liquid crystal alphanumeric display provides a variety of data including temperature, humidity and alarms. This advanced control provides a +/- 0.15°C and +/- 1.0% accuracy. All set points are adjustable by the multi-function interface key pad. There are no dials, switches or multiple controls to manipulate. For safety purposes, the controller has a user password entry system with high/low audible and visual alarms for temperature, humidity, power failure, sensor failure and other alarms tailored to meet your needs.

Service prompts indicate service times and maintenance information. Our programmable features allow you to control temperature, humidity and lights based on real time. The system includes expansion slots for communication interface to operate or monitor the entire system via a host computer. The control is mounted behind a key locked door with a molded acrylic cover protecting the controls from damage. All high voltage components are factory wired and are located in a NEMA 1/UL approved line voltage enclosure for added safety. An optional 10" circular chart recorder can be added to record seven days of temperature and humidity history. Optional Touch Screen HMI (Human Machine Interface) Programmable Control with graphical display and charting features.

Refrigeration

Nor-Lake Scientific refrigeration systems are designed for optimal temperature uniformity and minimal energy use. Continuous operation by use of hot gas by-pass provides close control of room temperature and greater efficiency. For maximum uniformity, an optional electronic proportional valve receives input from the programmable microprocessor control to vary capacity based on changes in load conditions. These factory assembled refrigeration systems include high/low pressure controls, receiver, sight glass, liquid line dryer, suction accumulator, vibration eliminators, expansion valves and other equipment required to achieve tight temperature tolerances. Outdoor units are complete with all weather hoods and winterized controls.

- Wall or ceiling mounted systems
- Indoor or outdoor models
- Temperatures: +4°C, -20°C, -30°C, -40C, +2°C to +93.3°C
- Optional Remote Capsule Pak™ Systems
- UL and CSA listed

Heating

Chrome steel sheath heaters with large finned area provide faster heat transfer and longer element life. All heating circuits have two safety shutdowns for maximum safety.

Dehumidification

A rotary bed dehumidifier using absorbent desiccant in conjunction with the application of heat reduces the grain moisture of the air. Portions of the walk-in are ducted to the dehumidifier for moisture reduction. This air is then returned to the chamber after being conditioned by the refrigeration system.

Humidification

Nor-Lake Scientific offers three types of humidification methods, selecting the most efficient and economical method to meet your specifications.

1. ***Steam Generator:*** With a stainless steel vaporizing chamber with welded seams, incoloy alloy sheathed resistance heaters and use a dripless stainless steel dispersion tube containing calibrated orifices to provide uniform humidity distribution.
2. ***Spray System:*** Relative humidity is induced by a highly efficient atomizing spray system with a stainless steel self cleaning nozzle.
3. ***Centrifugal Atomizer:*** This system incorporates a sealed motor and copper reservoir distributing humidification through centrifugal force.
4. ***Ultrasonic Atomizer:*** Highly efficient with no added heat, Completely welded stainless steel atomizer tank, Instant on/off for tight humidity control, Mountable interior or exterior

ENVIRONMENTAL ROOMS / STABILITY CHAMBERS

SPECIFICATIONS

Conditioning Systems

Ceiling Plenum: Consists of a diffusion grating made of high grade injection molded acrylic with multiple open cells installed below the ceiling panels provides a positive pressure air plenum extending across the entire room ceiling. All the lighting and air handling equipment consisting of evaporator coils, heater and drain pans are above this positive pressure plenum to allow light and conditioned air to be diffused uniformly into the room.

Wall and Ceiling Plenum: Consists of the ceiling plenum described above with an added vertical wall plenum. This provides air return through the floor of the chamber and into the conditioning system, assuring no stratification of air at the floor level.

Both plenums improve the temperature uniformity within the room. The ceiling plenum is the most commonly used method providing maximum storage space.

Lighting

Nor-Lake Scientific rooms utilize high output cool white fluorescent lamps or optional LEDS to provide consistent, uniform lighting. The lamps are provided with low temperature ballasts and are mounted in vapor proof gasketed UL fixtures, made of cast aluminum with Lexan globes. Typical lighting provides a light intensity of 70 foot candles when measured 40 inches above the floor at the specified operating temperature. Special lighting is available with a variety of programmable features.

Shelving

Both Free-Standing and Cantilevered Shelving is available. Cantilevered Shelving is completely adjustable, wall mounted and available in 16 gauge galvanized steel, .064 smooth aluminum or 16 gauge stainless steel. The shelves can be specified in 3, 4, 5 or 6 tiers and are completely sanitary having no folds, hems or crevices. Shelf widths are available in 10 inches, 20 inches, 22 inches and 24 inches.

Free-Standing Adjustable Wire Shelving is made of high quality wire and steel. Provided in Electro-Zinc plate, electrostatically applied epoxy and type 302 stainless steel. Available in 12 inches, 18 inches and 24 inches with 3, 4, 5 or 6 tiers.

Warranty

Warranty assures the product is free from defects in material or workmanship under normal use and service. The coverage includes a 15 year insulated panel warranty, five year compressor warranty and 18 months parts and labor warranty.

For Environmental Rooms built to your specifications, contact Nor-Lake Scientific at 800-477-5253.

727 Second Street
PO Box 248
Hudson, Wisconsin 54016
800-477-5253
715-386-2323
800-388-5253 Service/Parts
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www.norlakescientific.com

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NORLAKE SCIENTIFIC

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Part Number: 077438

NL708 (XWA11V)
Walk-In Temp / Door /Alarm / Light Module

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Operating Instructions Alarm/Light Module XWA11V

XWA11V
Walk-In Temp / Door /Alarm / Light Module

1. GENERAL DESCRIPTION

Model **XWA11V, 100x64 mm** format, is a microprocessor-based controller, suitable for temperature monitoring and alarming in a walk-in cooler or freezer. It is provided with two (2) Relay Contacts to control lights and an external alarm. It is provided with one (1) NTC probe input for temperature measurement. The unit has 2 Digital Inputs, one for a Door Switch and the 2nd as an optional Panic Switch. See the catalog for optional accessories. One 5Pin Input allows the user to program the parameter list with a **"Hot Key" (see section 9)**

Note: The default settings are listed in the back of this manual. They are set for Coolers (Medium Temp). For Freezers (Low Temp) you MUST Change the ALL and ALU settings. See Section 4.0

2. GENERAL WARNINGS

2.1 ⚠ PLEASE READ BEFORE USING THIS MANUAL

- This manual is part of the product and should be kept close to the instrument for easy and quick reference.
- The instrument shall not be used for purposes different from those described hereunder. It cannot be used as a safety device.
- Check the application limits before proceeding.

Note: If equipped with a battery backup, the battery must be installed after the walk-in has reached its operating temperature.

2.2 ⚠ SAFETY PRECAUTIONS

- Check if the supply voltage is correct before connecting the instrument.
- Do not expose the back of the instrument to water or moisture: use the controller only within the operating limits avoiding sudden temperature changes with high atmospheric humidity to prevent the formation of condensation.
- Warning: disconnect all electrical connections before performing any maintenance operation.
- Fit the probe where it is not damaged by the end-user. The instrument must not be opened.
- In case of failure or faulty operation send the instrument back to the distributor (see address) with a detailed description of the fault.
- Consider the maximum current that can be applied to each relay (see Technical Data).
- Ensure that the wires for probes, loads and the power supply are separated and far enough from each other, without crossing or intertwining, or you may get bad temperature readings.
- Be sure to seal any J-box with RT sealant to prevent cold and moisture intrusion.

Operating Instructions Alarm/Light Module XWA11V

3. INTERFACE

3.1 KEY FRONT PANEL OPERATION

set — In Programming Mode press to **select** a parameter or to **confirm** an operation.
Press and hold this key for more than 5 s **to turn the controller OFF.**
Press and hold this key for more than 1 s **to turn the controller back ON.**

HIGH — Press to see the HIGH Temp ALARM (**ALU** parameter)

LOW — Press to see the LOW Temp ALARM (**ALL** parameter)

In Programming Mode press to browse parameter codes.
Press to increase the displayed value.
Press to mute the buzzer (+ relay) when an ALARM is happening.
Hot key programming: with the instrument on, insert the hot key and then press the UP button.

In Programming Mode press to browse parameter codes.
Press to decreases the displayed value.

Switch ON and OFF the light of the cold room

KEY COMBINATIONS: PRESS SIMULTANEOUSLY

+ — To lock and unlock the Keyboard.

set + — To enter the Programming Mode.

set + — To exit the Programming Mode.

set + HIGH — To enter a new value for the HIGH Temp ALARM (**ALU**).

set + LOW — To enter a new value for the LOW Temp ALARM (**ALL**).

3.2 USE OF LEDS

Each LED function is described in the following table:

LED	MODE	Function
	ON	ALARM signaling
	ON	The light is on
°C	ON	Celsius degrees operation
°F	ON	Fahrenheit degrees operation

4. TEMP ALARM SETTINGS

4.1 HOW TO SET THE MIN TEMPERATURE ALARM

- **To modify the minimum (LOW)** Temp **ALARM:** hold the set + LOW keys pressed for 3 s until the minimum Temp alarm is displayed.
- Change the value using the **UP** and **DOWN** keys.
- Press the **SET** key to confirm the new value and exit.

4.2 HOW TO SET THE MAX TEMPERATURE ALARM

- **To modify the max (HIGH) Temp ALARM:** hold the set + HIGH keys pressed for 3 s until the max Temp alarm is displayed.
- Change the value using the **UP** and **DOWN** keys.
- Press the **SET** key to confirm the new value and exit.

5. PROGRAMMING

5.1 HOW TO CHANGE A PARAMETER VALUE MAIN MENU

1. Enter the Programming Mode by pressing the **SET** and **DOWN** key for **3s** (and will start blinking).
2. Select the required parameter. By using the **UP or DOWN** KEY
3. Press the "**SET**" key to display its value (now only the LED is blinking).
4. Use "**UP**" or "**DOWN**" to change its value.

Press "**SET**" to store the new value and move to the following parameter.
To exit: Press **SET + UP** or wait 15 s without pressing a key.
NOTE: the set value is stored even when the procedure is exited, by waiting the time-out to expire.

5.2 THE HIDDEN MENU (PR2)

The hidden menu includes all the parameters of the instrument.

5.2.1 HOW TO ENTER THE HIDDEN MENU (PR2)

1. Enter the Programming Mode by pressing the Set + **down** key for **3s** (and starts blinking).
2. When a parameter is displayed, **release and re-press** the **SET + down** for more than **7s**.
3. The **Pr2** label will be displayed immediately followed from the HY parameter. **NOW YOU ARE IN THE HIDDEN MENU.**
4. **Select** the required parameter as above
5. Press the "**SET**" key to display its value (Now only the LED is blinking).
6. Use "**UP"** or "**down"** to change its value.
7. Press "**SET**" to store the new value and move to the following parameter.

To exit: Press **SET + up** or wait **15s** without pressing a key.
NOTE: the set value is stored even when the procedure is exited by waiting the time-out to expire.

5.2.2 HOW TO MOVE A PARAMETER FROM THE HIDDEN MENU TO THE FIRST LEVEL AND VICEVERSA

Each parameter present in the HIDDEN MENU can be removed or put into "THE FIRST LEVEL" (user level) by pressing **"SET + down"**.
In HIDDEN MENU when a parameter is present in First Level the **decimal point LED is on**.

5.3 HOW TO LOCK THE KEYBOARD

1. Keep pressed for more than **3s** the **UP** and **DOWN** keys.
2. The "**POF**" message will be displayed and the keyboard will be **locked**. At this point it will be possible only to see the Set Point or the MAX or MIN Temp stored
3. If a key is pressed more than **3s** the "**POF**" message will be displayed.

5.4 TO UNLOCK THE KEYBOARD

Keep pressed together for more than **3s** the **UP** and **DOWN** keys. The **"PON"** message is displayed

6. LIGHT MANAGEMENT

6.1 TIMED REGULATION: I1L = Y

With **i1L = y** the light remains on at least for the **LHt** parameter.
The **LHt** timer is re-initialized every time the light button is pushed.
With **LHt=0** the light remains on until the light button is pushed again.

The light is switched on every time one of the following conditions happens:

- the door is open (**i1F = dor**)
- the presence sensor is activated (**i2F = LHt**)
- the light button is pushed

The light is switched off when all the following conditions happen:

- the **LHt** timer is exhausted
- the door is closed (**i1F = dor**)
- the presence sensor is de-activated (**i2F = LHt**)
- Light button regulation: i1L = n

The lights will flash (for 2 minutes) every 20 seconds for the **FLH** time (0-5 min) at the end of the **LHt** time as a warning that the lights are about to turn off (for incandescent and LED lights only).

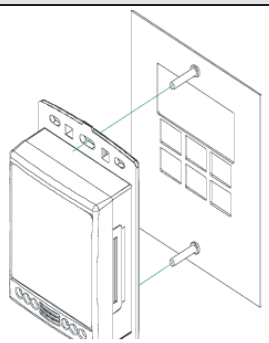
The **light button has a higher priority than digital inputs** therefore:
- if the light was switched on by button the digital input can not modify its status.
- if the light was switched on by digital input, the light button can modify its status.

7. INSTALLATION AND MOUNTING

7.1 MOUNTING OF XWA11V – PR10000

The **XWA11V** must be mounted on vertical panel, in a J-Box (Steel City PN 68371-1/2) or equal or wall mounted using an appropriate enclosure.

The Ambient Temp range for correct operation is 32 – 131°F (0-55°C). Avoid installation in places subject to strong vibrations, corrosive gases, excessive dirt or humidity. The same recommendations apply to probes.



8. ELECTRICAL CONNECTIONS

The instrument is provided with ¼" fast-on terminal blocks to connect cables with a cross section up to .110" for the digital and analog inputs. Relays and power supply have a Fast-on connection (.250"). For supply connections, use 14 AWG or larger copper or CU wire only rated at least 90˚C (194˚F). Before connecting cables make sure the power supply complies with the instrument requirements. Separate the probe cables from the power supply cables, from the outputs and the power connections. Do not exceed the maximum current allowed on each relay and in case of heavier loads use a suitable external relay.
N.B. Maximum current allowed for all the loads is 15A.

8.1 PROBE CONNECTIONS

The probe shall be mounted with the bulb upwards to prevent damages due to casual liquid infiltration. It is recommended to place the thermostat probe away from air streams to correctly measure the average room temperature. The probe can be extended up to 300 ft. Check calibration when running long lengths over 100ft.

9. USE OF THE PROGRAMMING "HOT KEY "

9.1 HOW TO PROGRAM A HOT KEY FROM THE INSTRUMENT (UPLOAD)

1. Program one controller with the front keypad.
2. When the controller is ON, insert the "**Hot key**" and push **UP** key; the **"uPL"** message appears followed a by flashing **"End"**
3. Push "**SET"** key and the **End** will stop flashing.
4. Turn OFF the instrument remove the **"Hot Key",** then turn it ON again.

NOTE: the "**Err**" message is displayed for failed programming. In this case push UP key again if you want to restart the upload again or remove the "**Hot key**" to abort the operation.

9.2 HOW TO PROGRAM AN INSTRUMENT USING A HOT KEY (DOWNLOAD)

1. Turn OFF the instrument.
2. Insert a **programmed "Hot Key" into the 5 PIN receptacle** and then turn the Controller ON.
3. Automatically the parameter list of the **"Hot Key"** is downloaded into the Controller memory, the "**doL**" message is blinking followed a by flashing **"End".**
4. After 10 seconds the instrument will restart working with the new parameters.
5. Remove the **"Hot Key".**

NOTE the message "**Err**" is displayed for failed programming. In this case turn the unit off and then on if you want to restart the download again or remove the "**Hot key**" to abort the operation.

10. ALARM SIGNALS

Message	Mode	Cause	Outputs
"P1"	Flashing	Probe failure	Alarm output ON
"PoF"	Flashing (3s)	Keyboard locked	Not changed
"Pon"	Flashing (3s)	Keyboard un-locked	Not changed
"HA"	Alternated with temp	Maximum T° alarm	Alarm output ON;
"LA"	Alternated with temp	Minimum T° alarm	Alarm output ON;
"dA"	Alternated with temp	Door switch alarm	Alarm output ON;
"EA"	Alternated with temp	External alarm	Alarm output ON;
"PAn"	Alternated with temp	Serious external alarm	Alarm output ON;
dEF	Alternated with temp	Defrost is running	Not changed

The alarm message is displayed until the alarm condition is reset.

10.1 SILENCING BUZZER

Once the alarm signal is detected the buzzer can be silenced by pressing the **UP** key.

10.2 ALARM RECOVERY

Probe alarms: "**P1**" (probe1 faulty), "**P2**"; they automatically stop 10s after the probe restarts normal operation. Check connections before replacing the probe.

T° alarms "**HA**" and "**LA**" automatically stop as soon as the thermostat T° returns to normal values or when the defrost starts.

Door switch alarm "**dA**" stops as soon as the door is closed.

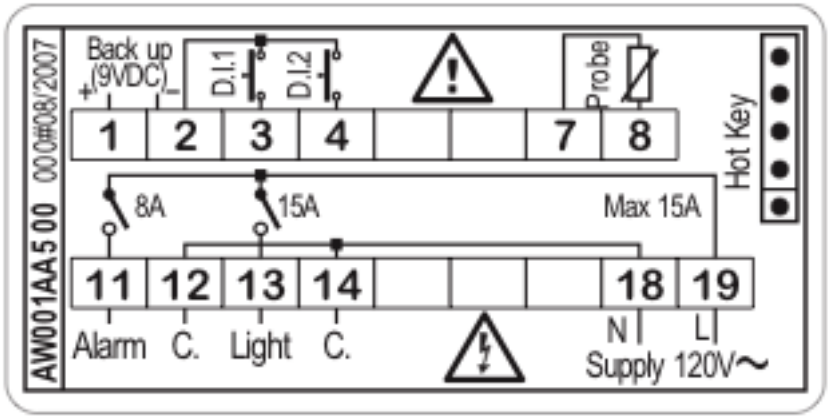
External alarms "**EAL**", "**BAL**" stops as soon as the external digital input is disabled.

Operating Instructions Alarm/Light Module XWA11V

11. TECHNICAL DATA

Housing: self extinguishing ABS
Case: face 100x64 mm; depth 45.5mm
Mounting: J-box or wall-mount in suitable enclosure
Frontal protection: IP65
Connections: ¼" fast-on for power, 1/8" fast-on for probes and Digital Inputs
Power supply: 120Vac ± 10%, optional 230Vac ± 10% MAX 15A
Power absorption: 4VA max.
Ambient Temperature: 32-131°F (0-55°C)
Display: 3 digits, red LED, 14,2 mm high.
Inputs: 1 NTC probe
Digital inputs: 2 free voltages
Relay outputs: Relay Contacts
Light: relay SPST 15A, 120Vac;
Alarm: relay SPST 8A, 120Vac
Other output: alarm buzzer
Data storing: on the non-volatile memory (EEPROM).
Measuring and regulation range:
NTC probe: -40÷110°C (-58÷230°F)
Resolution: 1 °F
Accuracy : ±1 °F

12. CONNECTIONS



Power supply: 120Vac +/- 10% 15A MAX current

13. PARAMETER MAP

LABEL	DESCRIPTION	VALUE	LEVEL	RANGE
ot	Thermostat probe calibration	0	Pr2	[-21°F - 21°F]
CF	Temperature measurement unit	F	Pr2	°C - °F
rES	Resolution (only for °C)	in	Pr2	dE - in
UT	Display update	60	Pr2	0 - 255 (sec.)
OnF	Off function enabling	y	Pr2	n - Y
ALU	High temperature alarm setting (med temp / low temp)	50 / 30	Pr1	ALL-302° F
ALL	Low temperature alarm setting (med temp / low temp)	30 / -20	Pr1	°-58 - ALU
AFH	Temperature alarm differential	2	Pr2	1°F - 45°F
ALd	Temperature alarm delay	30	Pr1	0 - 255 (min.)
dAo	Delay of temperature alarm at start-up	1.3	Pr2	0.0 - 24.0 Hrs.
EdA	Alarm delay at the end of defrost	30	Pr2	0 - 255 (min.)
dot	Delay of temperature alarm after closing the door	15	Pr2	0 - 255 (min.)
LHt	Light timer	15	Pr1	0 - 255 (min.)
FLH	Light Flashing Timer (time before light goes out that it will flash) (for incandescent & LED lights only)	2	Pr1	0 - 5 (Min)
doA	Open door alarm delay	15	Pr1	0 - 255 (min.)
oA1	First relay configuration	ALr	Pr2	ALr - LHt - OnF
oA2	Second relay configuration	LHt	Pr2	ALr - LHt - OnF
AOP	Alarm relay polarity	oP	Pr2	OP - CL
i1P	Digital input 1 polarity	CLoP	Pr2	OP - CL
i1L	Door switch to turn light ON	y	Pr2	n - Y
i1F	Digital input 1 operating mode	dor	Pr2	EAL - dor - dEr - LHt
i2P	Digital input 2 polarity	cL	Pr2	OP - CL
i2F	Digital input 2 operating mode	PAn	Pr2	EAL - Pan - dFr - LHt
did	Time interval/delay for digital input alarm	0	Pr2	0 - 255 (min.)
tbA	Alarm relay disabling	n	Pr2	n - Y
PbC	Kind of probe	ntc	Pr2	PtC - ntC
dP1	Real temperature Probe 1		Pr2	(probe value)
rEL	FW release		Pr2	read only
Ptb	Parameter map		Pr2	read only

14. PARAMETER LIST

Ot **Thermostat probe calibration:** (-12.0÷12.0°C/ -21÷21°F) allows to adjust possible offset of the thermostat probe.

CF **T measurement unit**: °C = Celsius; °F = Fahrenheit. When the measurement unit is changed the Set Point and the values of some parameters have to be modified.

rES **Resolution (for °C)**: (in = 1°C; dE = 0.1 °C) allows decimal point display.

Ut **Display update**: The time delay of the T readout (0÷255s)

onF **Off function enabling**: **n =** off function disabled; **y =** off function enabled;

ALU **High T° alarm setting**: (ALL ÷ 150°C or 302°F);
when this T° is reached and after the ALd delay time the HA alarm is enabled.

ALL **Low T° alarm setting**: (- 50°C or -58°F ÷ ALU)
when this T° is reached and after the ALd delay time, the LA alarm is enabled,.

AFH **T° alarm differential**: (0,1÷25,5°C; 1÷45°F) differential for T° alarm Set Point and fan regulation Set Point, always a positive value

ALd **T° alarm delay**: (0÷255 min) time interval between the detection of an alarm condition and the corresponding alarm signaling.

dAO **Delay of T° alarm at start-up**: (0min÷23h 50min) time interval between the detection of the T° alarm condition after the instrument power on and the alarm signaling.

EdA **Alarm delay at the end of** defrost: (0÷255 min) Time interval between the detection of the T° alarm condition at the end of defrost and the alarm signaling.

dot **Delay of T° alarm after closing the door**: (0÷255 min) Time delay to signal the T° alarm condition after closing the door.

LHt **Light timer**: (0-255 min) The time the light will stay on after pressing the light switch on the keyboard.

FLH **Light Flashing**: (0-5 min) The light will “double flash” every 20 seconds during the FLH time period before turning off after the LHt time. (For incandescent and LED lights only.)

doA **Open door alarm delay**:(0÷255 min) delay between the detection of the open door condition and its alarm signaling: the flashing message “dA” is displayed.

oA1 **First relay configuration: (14-15): ALr =** alarm; **LHt** = light; **onF =** on/off relay

oA2 **Second relay configuration: (14-16): ALr =** alarm; **LHt** = light; **onF =** on/off relay

AOP **Alarm relay polarity:** cL = closing contacts; oP = opening contacts.

i1P **Digital input 1 polarity (1-2)**: CL : the digital input is activated by closing the contact;
OP: the digital input is activated by opening the contact

i1L **Door switch to turn light ON(1-2):** (y / no) To turn the light ON automatically when the door is open. The light will turn off based on LHt . Keyboard switch must be turned ON first.

i1F **Digital input 1 operating mode(1-2): EAL** = external alarm; **dor** = door switch; **dFr** = A defrost is running; **LHt** = keep light ON (signal from occupancy sensor) override LHt.;

i2P **Digital input 2 polarity (1-3)**: CL : the digital input is activated by closing the contact;
OP: the digital input is activated by opening the contact

i2F **Digital input 2 operating mode**: configure the digital input function:
EAL = External alarm;
PAn =Panic alarm;
dFr = A defrost is running; (need external CT’s)
LHt = Keep light ON (signal from occupancy sensor) overrides LHt.

did **Time interval/delay for digital input alarm**:(0÷255 min.) If I2F=EAL or PAn (external alarms), “did” parameter defines the time delay between the detection and the successive signaling of the alarm.

tbA **Alarm relay & Buzzer disabling:** (**y** ; **no**)

Pbc **Type of probe (PTC, NTC)**

dP1 **Probe 1 T**

rEL **Software release** for internal use.

Ptb **Parameter table code:** read only.

QUICK SHEET
XWA11V Walk-in Alarm / Door / Alarm / Light Unit Operation Manual

In Normal Operation the Indicator will display the temperature. 36° F

CHECK ALARM SETPOINTS (Cooler HA = 50°F, LA = 30°F **/ Freezer** HA = 30°F, LA = -20°F**)**

To SEE the HIGH Alarm Set Point Press and release the HIGH Key, It will display the High Set Point for 5 seconds. The Temp alarm will go ON if the temp exceeds the Set Point after 15 minutes. The display will read HA alternating with the Temp.

To SEE the LOW Alarm Set Point Press and release the LOW Key it will display the Low Set Point for 5 seconds. The Temp alarm will go ON if the temp exceeds the Set Point after 15 minutes. LA, alternating with the Temp.

CHANGE ALARM SETPOINTS

1. To Change the HIGH Alarm Set Point Press BOTH the HIGH + set for 7 seconds and the LED above the will blink.
2. Release and scroll UP to adjust the Set Point up, or Scroll DOWN to adjust the Set point down.
3. Press set to confirm the change.
4. For Low Set Point repeat the procedure with the LOW + set

LIGHT OPERATION

Press the light switch to turn ON the inside light; it will automatically go OFF after 15 minutes.

DOOR SWITCH

If the door switch is used opening the door will automatically turn the light ON, and will automatically go OFF after 15 minutes.

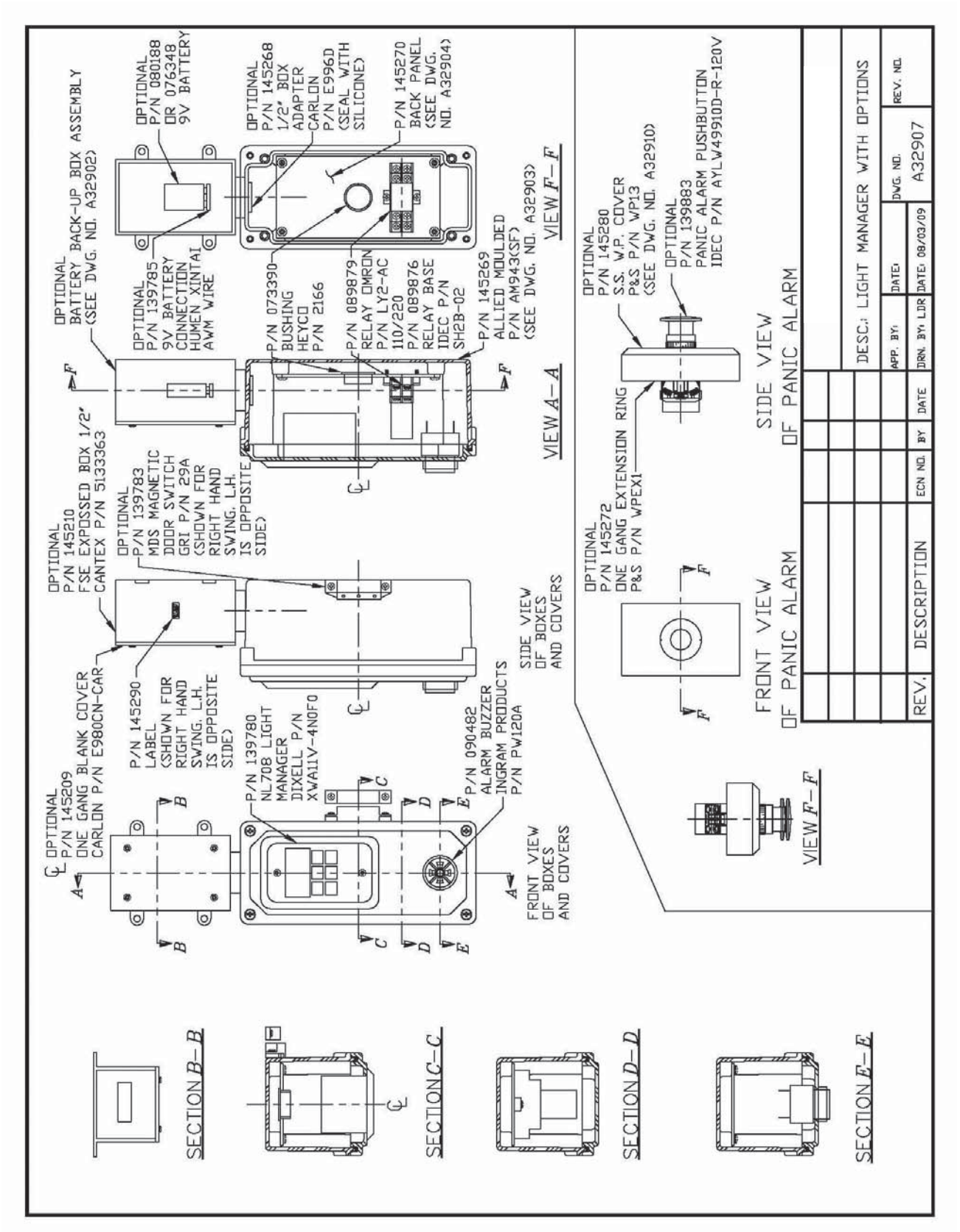
If the Door is left open longer than 15 minutes the DOOR Alarm will go off, dA alternating with the temperature reading.

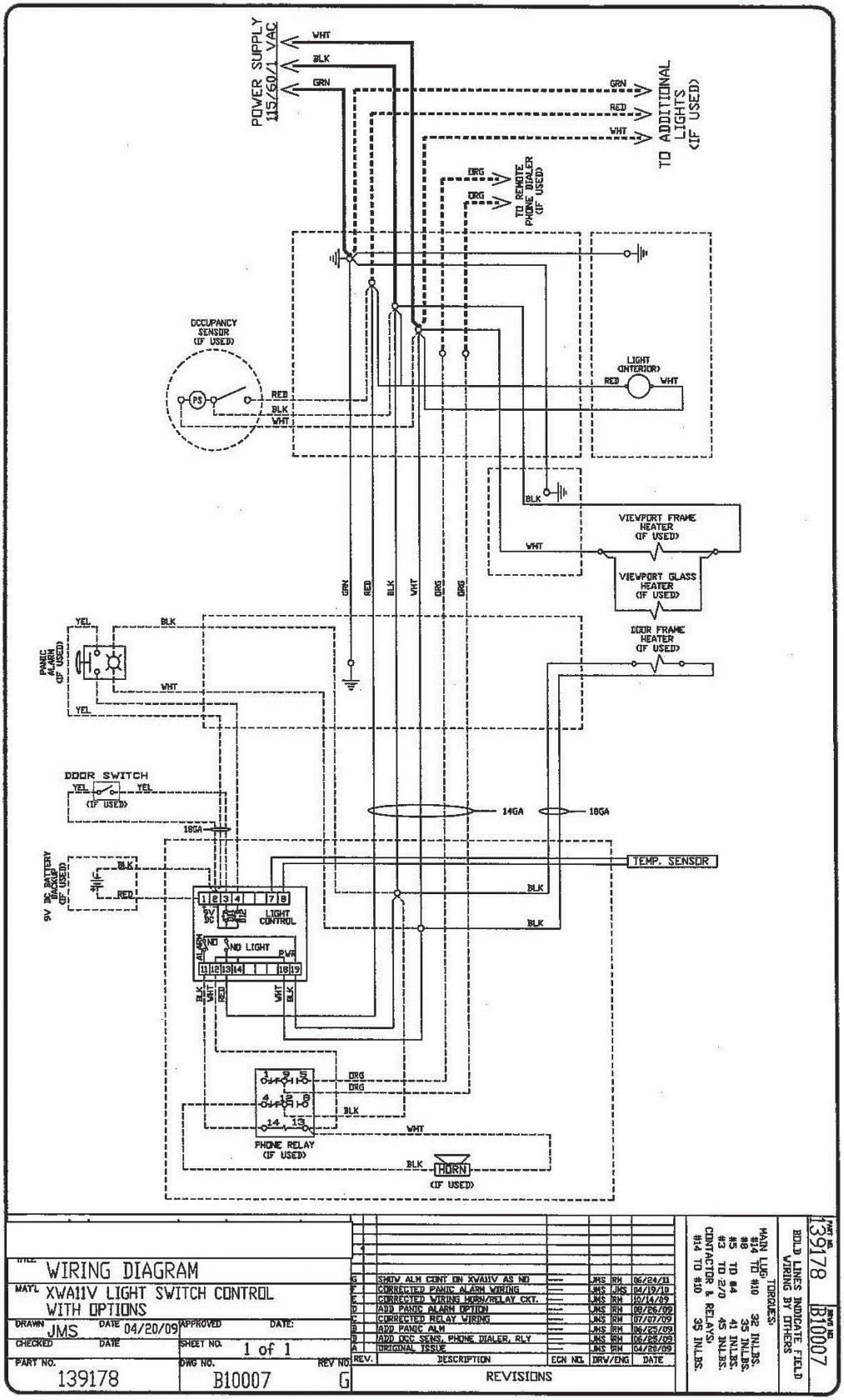
ALARM SIGNALS

P1	Flashing	PROBE FAILURE
HA	Alternated with temp	HIGH TEMP ALARM
LA	Alternated with temp	LOW TEMP ALARM
dA	Alternated with temp	DOOR OPEN ALARM
PAn	Alternated with temp	PANIC ALARM (need opt. panic switch)

Walk-In Alarm System Parts List

NOR-LAKE P/N	Description
139780	XWA11V Walk-In Alarm Module
145288	5 Foot Probe
139807	30 Foot Probe
139783	MDS Magnetic Door Switch – Door Open Alarm
090482	EXT/BUZ Alarm Buzzer
139809	'iDial2' Two Zone Phone Dialer
089879	Relay for 'iDial2'
139883	PAN Panic Alarm Switch
139785	9V Battery Holder
145267	Occupancy Sensor
089876	Relay Base
142469	Remote 2 x 4 Buzzer Box (includes buzzer)
080188	Battery, 9V, Alkaline


OPTIONAL P/N 145209 ONE GANG BLANK COVER CARLON P/N E980CN-CAR
OPTIONAL P/N 145210 FSE EXPOSSED BOX 1/2" CANTEX P/N 5133363
OPTIONAL BATTERY BACK-UP BOX ASSEMBLY (SEE DWG. NO. A32902)
OPTIONAL P/N 080188 OR 076348 9V BATTERY
OPTIONAL P/N 139785 9V BATTERY CONNECTION HUMEN XINTAI AWM WIRE
OPTIONAL P/N 145268 1/2" BOX ADAPTER CARLON P/N E996D (SEAL WITH SILICONE)
P/N 145270 BACK PANEL (SEE DWG. NO. A32904)
P/N 073390 BUSHING HEYCO P/N 2166
P/N 089879 RELAY OMRON P/N LY2-AC 110/220
P/N 089876 RELAY BASE IDEC P/N SH2B-02
P/N 145269 ALLIED MOULDED P/N AM943(SF) (SEE DWG. NO. A32903)
OPTIONAL P/N 139783 MDS MAGNETIC DOOR SWITCH GRI P/N 29A (SHOWN FOR RIGHT HAND SWING. L.H. IS OPPOSITE SIDE)
P/N 145290 LABEL (SHOWN FOR RIGHT HAND SWING. L.H. IS OPPOSITE SIDE)
P/N 139780 NL708 LIGHT MANAGER DIXELL P/N XWA11V-4N0F0
P/N 090482 ALARM BUZZER INGRAM PRODUCTS P/N Pw120A
OPTIONAL P/N 145272 ONE GANG EXTENSION RING P&S P/N WPEX1
OPTIONAL P/N 145280 S.S. W.P. COVER P&S P/N WP13 (SEE DWG. NO. A32910)
OPTIONAL P/N 139883 PANIC ALARM PUSHBUTTON IDEC P/N AYLW49910D-R-120V
VIEW A-A
VIEW F-F
SIDE VIEW OF BOXES AND COVERS
FRONT VIEW OF BOXES AND COVERS
SIDE VIEW OF PANIC ALARM
FRONT VIEW OF PANIC ALARM
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E
DESC.: LIGHT MANAGER WITH OPTIONS
APP. BY: DATE: DWG. NO. A32907 REV. NO.
DRN. BY: LDR DATE: 08/03/09
REV. DESCRIPTION ECN NO. BY DATE



TITLE: WIRING DIAGRAM					
MAT'L: XWA11V LIGHT SWITCH CONTROL WITH OPTIONS					
DRAWN: JMS	DATE: 04/20/09	APPROVED	DATE:		
CHECKED	DATE	SHEET NO.: 1 of 1			
PART NO.: 139178	DWG NO.: B10007	REV NO.: G			

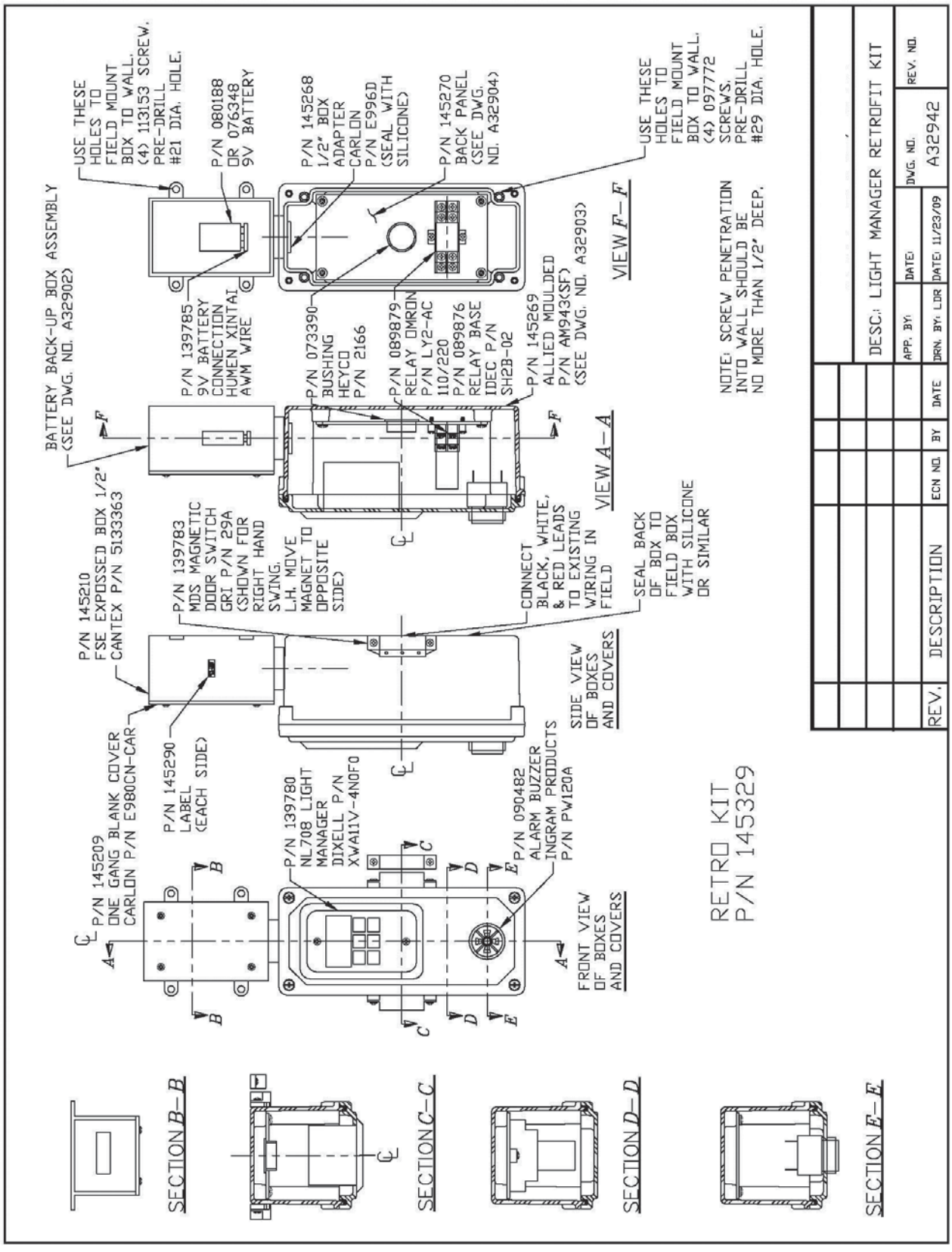
REV.	DESCRIPTION	ECN NO.	DRV/ENG	DATE
G	SHOW ALM CONT ON XWA11V AS NO		JMS RH	06/24/11
F	CORRECTED PANIC ALARM WIRING		JMS JMS	04/19/10
E	CORRECTED WIRING HORN/RELAY CKT.		JMS RH	10/14/09
D	ADD PANIC ALARM OPTION		JMS RH	09/25/09
C	CORRECTED RELAY WIRING		JMS RH	07/07/09
B	ADD PANIC ALM		JMS RH	06/23/09
B	ADD OCC SENS, PHONE DIALER, RLY		JMS RH	06/22/09
A	ORIGINAL ISSUE		JMS RH	04/20/09

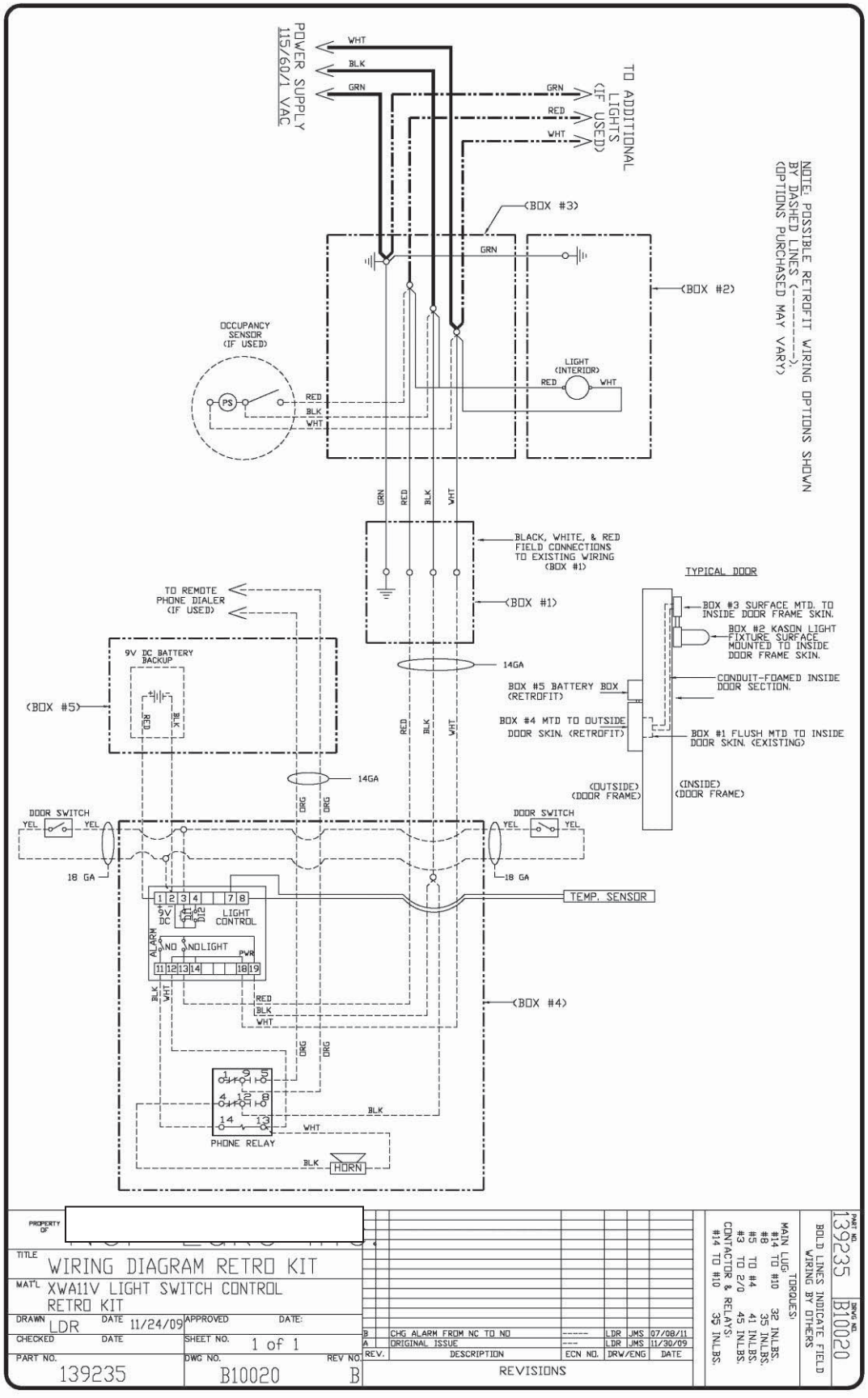
REVISIONS

MAIN LUGS TORQUES:
#14 TO #10 32 INLBS.
#8 TO #10 35 INLBS.
#5 TO #4 41 INLBS.
#3 TO 2/0 45 INLBS.
CONTACTOR & RELAYS:
#14 TO #10 35 INLBS.

BOLD LINES INDICATE FIELD WIRING BY OTHERS

PART NO. 139178 REV NO. B10007


RETRO KIT
P/N 145329
DESC: LIGHT MANAGER RETROFIT KIT
DWG. NO. A32942
REV. NO.
REV. DESCRIPTION ECN NO. BY DATE
APP. BY: DATE:
DRN. BY: LDR DATE: 11/23/09
P/N 145209 ONE GANG BLANK COVER CARLON P/N E980CN-CAR
P/N 145290 LABEL (EACH SIDE)
P/N 145210 FSE EXPOSED BOX 1/2" CANTEX P/N 5133363
P/N 139780 NL708 LIGHT MANAGER DIXELL P/N XWA11V-4N0F0
P/N 090482 ALARM BUZZER INGRAM PRODUCTS P/N PW120A
FRONT VIEW OF BOXES AND COVERS
SIDE VIEW OF BOXES AND COVERS
P/N 139783 MDS MAGNETIC DOOR SWITCH GRI P/N 29A (SHOWN FOR RIGHT HAND SWING, L.H. MOVE MAGNET TO OPPOSITE SIDE)
CONNECT BLACK, WHITE, & RED LEADS TO EXISTING WIRING IN FIELD
SEAL BACK OF BOX TO FIELD BOX WITH SILICONE OR SIMILAR
VIEW A-A
VIEW F-F
BATTERY BACK-UP BOX ASSEMBLY (SEE DWG. NO. A32902)
P/N 139785 9V BATTERY CONNECTION HUMEN XINTAI AWM WIRE
P/N 080188 OR 076348 9V BATTERY
USE THESE HOLES TO FIELD MOUNT BOX TO WALL. (4) 113153 SCREW. PRE-DRILL #21 DIA. HOLE.
P/N 073390 BUSHING HEYCO P/N 2166
P/N 089879 RELAY OMRON P/N LY2-AC 110/220 P/N 089876 RELAY BASE IDEC P/N SH2B-02
P/N 145268 1/2" BOX ADAPTER CARLON P/N E996D (SEAL WITH SILICONE)
P/N 145270 BACK PANEL (SEE DWG. NO. A32904)
P/N 145269 ALLIED MOULDED P/N AM943(SF) (SEE DWG. NO. A32903)
USE THESE HOLES TO FIELD MOUNT BOX TO WALL. (4) 097772 SCREWS. PRE-DRILL #29 DIA. HOLE.
NOTE: SCREW PENETRATION INTO WALL SHOULD BE NO MORE THAN 1/2" DEEP.
SECTION B-B
SECTION C-C
SECTION D-D
SECTION E-E

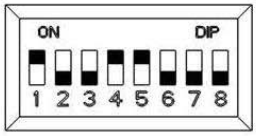

POWER SUPPLY 115/60/1 VAC
WHT
BLK
GRN
TO ADDITIONAL LIGHTS (IF USED)
GRN
RED
WHT
NOTE: POSSIBLE RETROFIT WIRING OPTIONS SHOWN BY DASHED LINES (<--------->). (OPTIONS PURCHASED MAY VARY)
(BOX #3)
GRN
(BOX #2)
OCCUPANCY SENSOR (IF USED)
PS
RED
BLK
WHT
LIGHT (INTERIOR)
RED
WHT
GRN
RED
BLK
WHT
BLACK, WHITE, & RED FIELD CONNECTIONS TO EXISTING WIRING (BOX #1)
(BOX #1)
TYPICAL DOOR
TO REMOTE PHONE DIALER (IF USED)
BOX #3 SURFACE MTD. TO INSIDE DOOR FRAME SKIN.
BOX #2 KASON LIGHT FIXTURE SURFACE MOUNTED TO INSIDE DOOR FRAME SKIN.
9V DC BATTERY BACKUP
14GA
CONDUIT-FOAMED INSIDE DOOR SECTION.
(BOX #5)
BOX #5 BATTERY BOX (RETROFIT)
BOX #4 MTD TO OUTSIDE DOOR SKIN. (RETROFIT)
BOX #1 FLUSH MTD TO INSIDE DOOR SKIN. (EXISTING)
RED
BLK
WHT
14GA
(OUTSIDE) (DOOR FRAME)
(INSIDE) (DOOR FRAME)
DOOR SWITCH
YEL
YEL
DRG
DRG
DOOR SWITCH
YEL
YEL
18 GA
18 GA
TEMP. SENSOR
1 2 3 4 7 8
9V DC
D11
D12
LIGHT CONTROL
ALARM
NO
NO
LIGHT
PWR
11 12 13 14 18 19
BLK
WHT
RED
BLK
WHT
(BOX #4)
DRG
DRG
1
9
10
4
12
8
14
13
BLK
WHT
PHONE RELAY
BLK
HORN
PROPERTY OF
TITLE
WIRING DIAGRAM RETRO KIT
MAT'L
XWA11V LIGHT SWITCH CONTROL RETRO KIT
DRAWN
LDR
DATE
11/24/09
APPROVED
DATE:
CHECKED
DATE
SHEET NO.
1 of 1
PART NO.
139235
DWG NO.
B10020
REV NO.
B
B CHG ALARM FROM NC TO NO ----- LDR JMS 07/08/11
A ORIGINAL ISSUE --- LDR JMS 11/30/09
REV. DESCRIPTION ECN NO. DRW/ENG DATE
REVISIONS
MAIN LUG TORQUES:
#14 TO #10 32 INLBS.
#8 35 INLBS.
#5 TO #4 41 INLBS.
#3 TO 2/0 45 INLBS.
CONTACTOR & RELAYS:
#14 TO #10 35 INLBS.
BOLD LINES INDICATE FIELD WIRING BY OTHERS
PART NO.
139235
DRWG NO.
B10020

Operating Instructions Alarm/Light Module XWA11V

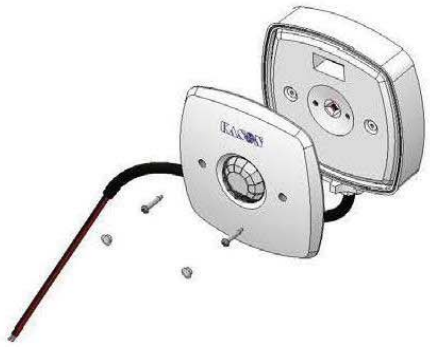
Installation:

1. The ideal location for the sensor is above door aimed to 8' in front of the doorway. To limit false tripping keep away from fans and vent ports. See "Sensor Set Up and Testing."
2. Thread the ½ NPT arm into a threaded 90° elbow, junction box or into light fixture housing. It is best to be able to adjust rotation and tilt of the sensor.
3. Connect the line voltage, neutral and load wires to the sensor leads as shown in wiring diagram (pg. 2).
4. Test the sensor for sensitivity and range (pg. 2). This unit is pre-set based on typical walk-in applications for a 1 minute delay and 80% sensitivity. If your application requires alternate settings, simply remove the front cover (2 screws & seals) and make the necessary changes. Remember to reinstall the two screw seals when finished.

Factory Settings



1 2 PIR Sensitivity	**3 4 5 Delay**	**6 7 8 Sensor**
↓ ↓ 100% high	↓ ↓ ↓ 10 seconds	↓ ↓ ↓ (factory)
↓ ↑ 90%	↓ ↓ ↑ 20 seconds	
↑ ↓ 80% (factory)	↓ ↑ ↓ 30 seconds	
↑ ↑ 70%	↓ ↑ ↑ 1 minute (factory)	
	↑ ↓ ↓ 2 minutes	
	↑ ↓ ↑ 5 minutes	
	↑ ↑ ↓ 10 minutes	
	↑ ↑ ↑ 20 minutes	



Sensor Assembly

Specifications:

Voltage: 120 / 277 VAC @ 60 Hz
Load: 120 VAC / 0- 800W ballast
277 VAC / 0-1200W ballast
Time Delay: 10 seconds – 20 minutes
Size: 4"H x 4"W x 2.16"D
[102.58cm*102.58cm*55cm]
Weight: 0.5 lbs [227 grams]
Temperature:
Min: -20 °F [-28.9 °C]
Max: 160 °F [60 °C]
Electrical Connection:
½" conduit connection
18" 18 AWG wire
IP 65
Wire temperature 105 deg C max *
cULus Wet location -Indoor Use Only
NSF
Protective Device:
A fast blow fuse or circuit breaker mounted within 25 feet from sensor (**Line** side) is required.

***Some incandescent fixtures may require higher temperature wires. Remote mounting or adding fiberglass sleeves over the wires may be required.**

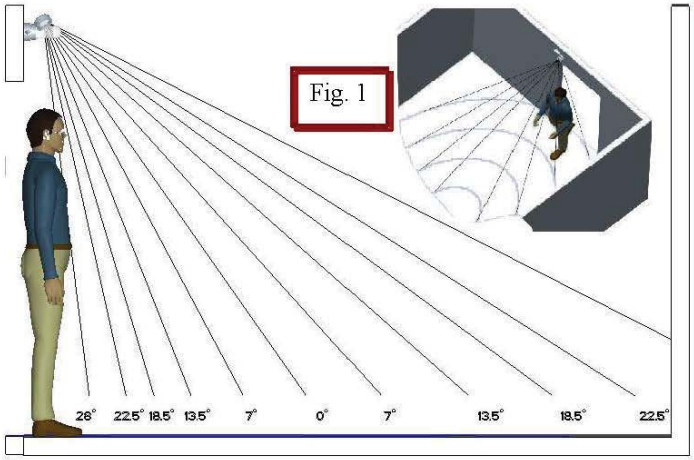
WARNINGS AND CAUTIONS:

- All installation must comply with local and National Electrical Codes.
- The manufacturer assumes no responsibility for improper installation or application.
- Turn off electricity at the breaker or fuse box before installation.

Special Note from the field:

Always disable any existing light switches. The motion sensor will not function as intended if the customer can turn the circuit off or has the ability to override the motion sensor.

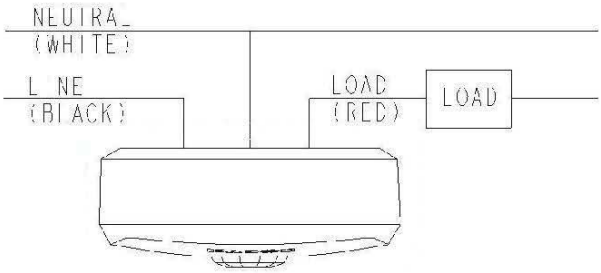
Sensor Set Up and Testing



Location:
Sensor should be placed above the door. Sensor should be angled toward the center of the room without any obstructions. Sensor lens is designed to work in zones. If occupant crosses a zone the sensor will turn the lights on. Zones are represented by the rings on the floor in (Fig. 1).

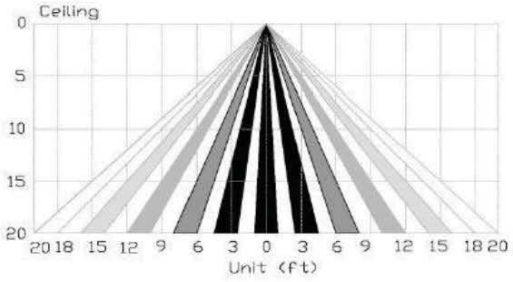
Testing:
Allow a few minutes for the sensor to warm up then ENTER room. The sensor is equipped with a "Red LED" indicator that will activate when motion is sensed. Make note where the sensor sees motion and turns on the light. Repeat movement after allowing lights to turn off.
Adjust sensor head for best room coverage. If the LED indicator is not visible then wait for the lights to go off.
Additional sensor may be required for large / long rooms.

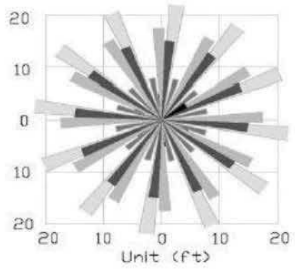
Wiring for Single



Replacement Parts List:

11901A00005	Low Bay sensor module (up to 20')
11901000009	Wall mounting kit with cord grip

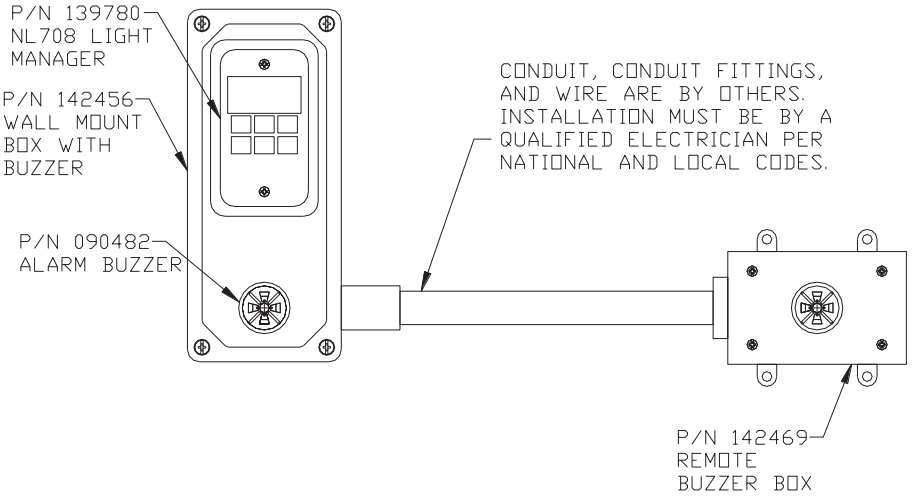


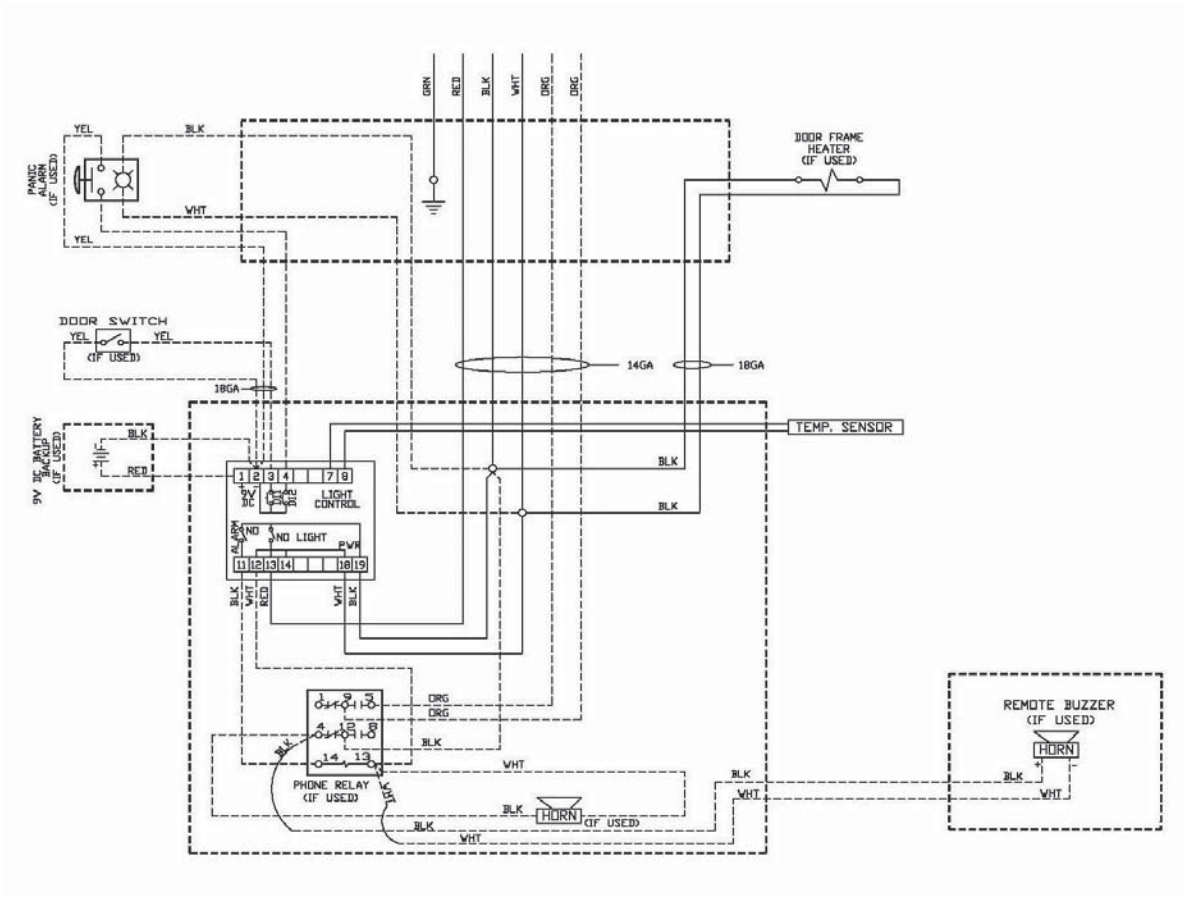


Remote Buzzer Box Installation

Installation:

1. Mount the remote buzzer box in the location desired.
2. Drill the appropriate size hole for the conduit fitting into the Wall Mount Box P/N 142456.
3. Conduit, conduit fittings, and wire are by others.
   Installation must be by a qualified electrician per the applicable national and local codes.
4. Connect a black wire to terminal #4 and a white wire to terminal #13 of the Phone Relay in the Wall
5. Mount Box.





NOTES

NOTES

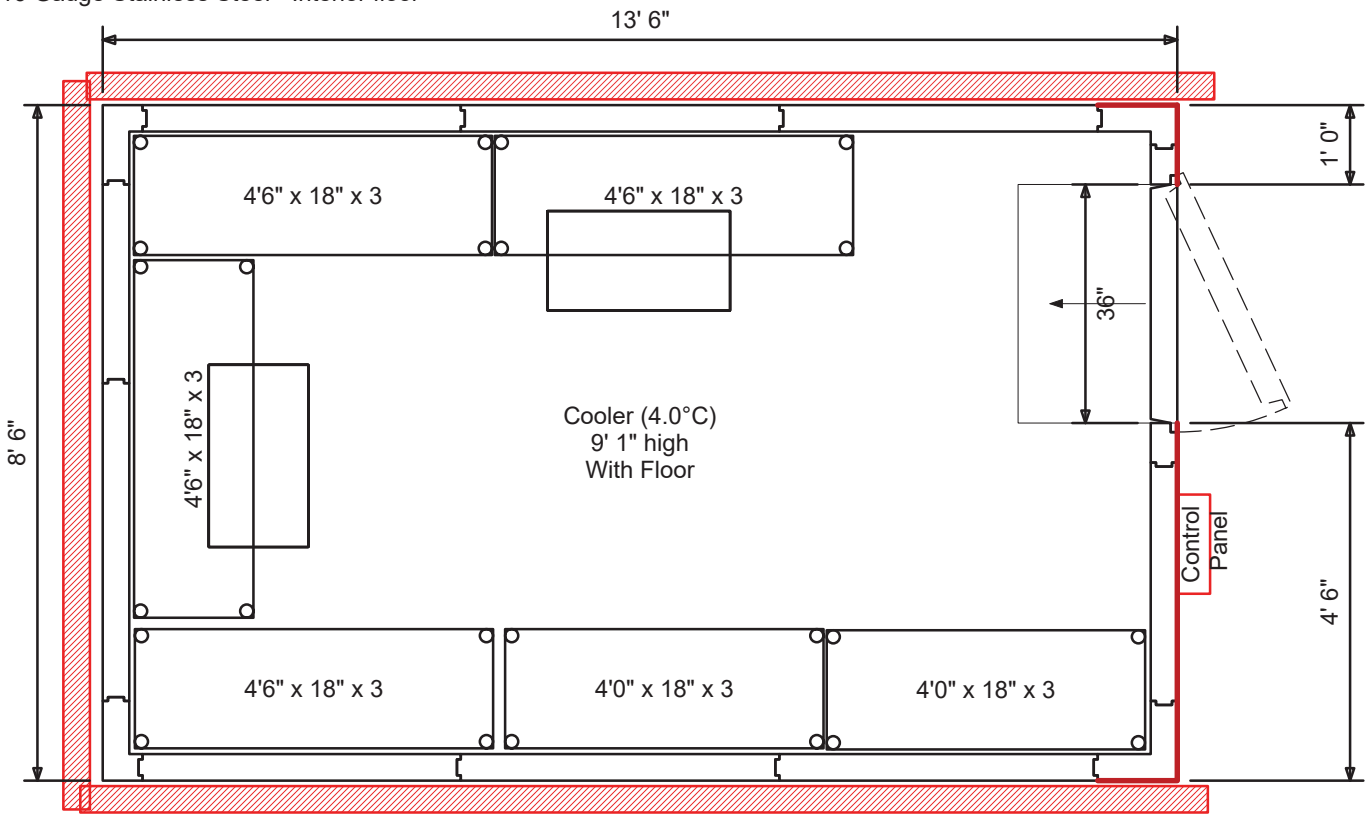
SCIENTIFIC
Second and Elm Streets
P.O. Box 248
Hudson, Wisconsin 54016
800-477-5253
715-386-2323
715-386-6149 FAX

Prepared by: _____

Nor-Lake is registered by UL to ISO 9001-2008. California State Contractor License #940932.THIS BID, IF ACCEPTED, IS SUBJECT TO EXECUTION OF A WRITTEN CONTRACT OR PURCHASE ORDER.

(1) Nor-Lake ENVIROLINE 4.0 Walk-In Cooler
13' 6" long, 8' 6" wide, 9' 1" high.

Finishes:
20 Gauge Stainless Steel - Interior wall, Interior ceiling
26 Gauge Corrosion Resistant Stucco Embossed Coated Steel - Exterior wall
26 Gauge Embossed White Steel - Exposed wall, Exterior door frame, Exterior door
26 Gauge Smooth Galvanized - Ceiling topside, Floor bottom side
16 Gauge Stainless Steel - Interior floor



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(6) Lin. Ft. Of Hat-Shaped Bumper Rail, 16 Stainless Steel, 1 1/2 " High x 3" Wide With Concealed Fasteners - (on two partial exposed interior walls)
(100) Sq. Ft. Of 1/8" Vinyl Floor Matting Black
(1) Seismic Calculations and Tie Downs (CA) Includes calculations being provided for the customer to present to the appropriate approval office. If additional resubmittals are required a separate Purchase Order must be received prior to beginning the seismic calculation resubmittal process. Any additional resubmittal will not be worked on until review of the original funds is evaluated and additional costs submitted, and an additional Purchase Order is received. NOTE: The walk-in will not be released to Production until the seismic approval has been approved by the appropriate California approval office. If seismic tie downs are required the concrete pad must extend 6" beyond the face of the walk-in.
(1) 36" X 78" Walk-In Door right-hand swing
Includes door closer, cam lift hinges (one spring loaded), NL9800 deadbolt key/padlock handle with inside release, magnetic gasket, heater wire, (thermostatically controlled by control panel), double sweep gasket & switch with pilot light.
(1) 36" High, Interior 1/8" Aluminum Diamond Tread, Door And Frame Mounted Kickplates (Includes Extra Hinge).
(1) 14" x 24" 3-Pane Unheated Viewport With Frame Heater (Indoor Only)
(1) Door Through Panel Electrical; All Conduit Concealed Inside The Door Frame, Hole Pre-Drilled Through Ceiling And Field Installed Ceiling Mounted Junction Box With Conduit Provided.
(1) Hydraulic Door Closer K1094 (082656), In Lieu Of Standard K1095
(1) 36" Interior Ramp With Non-Skid Strips Applied To Top (24" Deep)
Sq. Ft. Of 3/4" CDX Plywood Subfloor for Cooler (4.0°C)
(2) 48" Fluorescent, Vapor-Proof, Freezer Light Fixture With T5 Bulbs And Low Temperature Electronic Ballast (Shipped Loose)
(3) Junction Box Installed In Wall For Card Reader by Others With Power Stubbed To Ceiling Topside.
(1) Inside Panic Alarm System With "Personnel Emergency" Sign, Actuator, And Sounder.
(2) Stainless Steel Shelving (Amco II) 4' 0" x 6' 0" x 1' 6" x 3 tiers.
(4) Stainless Steel Shelving (Amco II) 4' 6" x 6' 0" x 1' 6" x 3 tiers.
(2) 6" x 12" Plastic Tapping Plates at the Top of the Door and Frame for Card Reader by Others

(1) Model CP6L Series Control Panel, U.L. Approved. CP6L Microprocessor Based Programmable Temperature Controller, Liquid Crystal Alphanumeric Display with 4x20 Character, Simultaneous Product and Air Temperature Display, System Mode Indicator, High/Low Audio and Visual Alarm with Dry Contacts. Power Failure Alarm, Service Prompts, Password Entry System and Expandable for Communication Ports and Light Control. Key Locked Door with Viewing Cover, Circuit Breakers and 10" Temperature Chart Recorder.
(1) CPB Series Back Up Outputs For Multi Compressor Control.
Back up output provides automatic compressor rotation based on user selected time period, or both systems run simultaneous based on demand, or user selected temperature setting.

(2) Special NWAD75RL3 (4 deg. C) Operation, High Temperature, Water Cooled, R-404A, Refrigerant, Remote Refrigeration System, Accessible Hermetic , Low Profile Unit Cooler, Meets CEC Requirements, Condensing Unit Rack Overall Size Is 26.75 Inches Wide, 35 Inches Long And 19 Inches High. Unit Cooler Overall Size Is 15 Inches Wide, 27.5 Inches Long And 15.25 Inches High. Condensing Unit, 208/230-3-60 Electrical Requirements Are 3.8 Minimum Circuit AMPS And 15 Maximum Fuse Size. (system capacity 6296 BTU's/hour at 37.8°C ambient temperature.)
.(1) Piping Diagram
Calculated load for Cooler (4.0°C) is 3443 BTU's/hour calculated from 24 deg. C ambient temperature, 21.1 deg. C floor temperature (insulated floor), 23 minutes open door time per 24 hrs for(1) 36.00" X 78.00" walk-in door opening into 24 deg. C ambient (normal use), (2) 48" Fluorescent, Vapor-Proof, Freezer Light Fixture With T5 Bulbs And Low Temperature Electronic Ballast (Shipped Loose) 108 Watts operating 12 hours per day, no occupants working in the room, no vent air, and no additional electrical load. All calculations are based on data supplied by ASHRAE publications
Refrigeration is “sized” for holding product only; that is; our calculation is based on product entering at the same temperature as the desired temperature of this walk-in. If you feel that this is insufficient, please advise.